Research Product 85-1

AUTOMATED ASSISTANCE FOR FIRE SUPPORT COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE (C^3I)

Battlefield Information Systems Technical Area
Systems Research Laboratory

January 1985

U. S. Army Research Institute for the Behavioral and Social Sciences

U. S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency under the Jurisdiction of the Deputy Chief of Staff for Personnel

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for the Department of the Army

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: ARI Research Product 85-1	2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle): AUTOMATED ASSISTANCE FOR FIRE SUPPORT COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE (C^3I)	5. TYPE OF REPORT & PERIOD COVERED: 15 Sept. 1980 - 1 Mar. 1983
	6. PERFORMING ORG. REPORT NUMBER: --
7. AUTHOR(s): Gary Witus, Janice Patton, & Peter Cherry	8. CONTRACT OR GRANT NUMBER(s): MDA 903-81-C-0579
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Vector Research, Incorporated, P.O. Box 1506, Ann Arbor, MI 48106	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 2Q162717A790, 2Q263739A793
11. CONTROLLING OFFICE NAME AND ADDRESS: U.S. Army Research Institute for the Behavioral and Social Sciences, 5001 Eisenhower Avenue, Alexandria, VA 22333-5600	12. REPORT DATE: January 1985
	13. NUMBER OF PAGES: 171
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office): --	15. SECURITY CLASS. (of this report): Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE: --

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

--

18. SUPPLEMENTARY NOTES

Contracting officer's representative was Dorothy L. Finley.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Automation
Soldier/machine task allocation
Fire Support command and control

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Problems in designing C^3I system functions and concepts to improve performance of staff operations have been ascribed to difficulties in structuring and decomposing manual information handling tasks, poor understanding of applications of ADP, and limited understanding of the cognitive friction between personnel and ADP systems. This report describes a methodology developed to overcome these problems. The core of the methodology includes a taxonomy of generic C^3I tasks, a taxonomy of generic classes of ADP services, → (Continued)

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and a matrix relating potential uses of ADP services to support generic C^3I tasks. The report illustrates the methodology by applying it to the Advanced Field Artillery Tactical Data System and includes an analysis of ADP services provided by systems using low risk hardware and software approaches, a decomposition of fire support C^2 functions into detailed and elementary subfunctions, and recommendations concerning the use of ADP services to provide automated assistance to the fire support C^2 functions and subfunction.

Keywords: Soldier machine task allocation.

Accession For	
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DTIC TAB	☐
Unannounced	☐
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AUTOMATED ASSISTANCE FOR FIRE SUPPORT COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE (C^3I)

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Office, Deputy Chief of Staff for Personnel
Department of the Army

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Army Project Number
2Q162717A790
2Q263739A793

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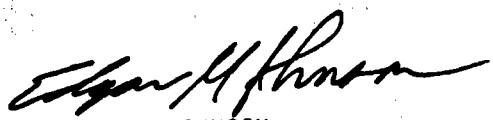
FOREWORD

The research addresses the development of methodology for the allocation of tasks and functions to soldiers and/or automated data processing in command and control systems and was part of a more comprehensive task which emphasized design and evaluation of C^2I systems.

The research used as an exemplar system the Advanced Field Artillery Tactical Data System (AFATDS).



EDGAR M. JOHNSON
Technical Director

ACKNOWLEDGMENTS

The contribution of the Program Manager, AFATDS is noted, as is that of Major Howard Rubin of the U.S. Army Field Artillery Center and School, Fort Sill, Oklahoma. The support and encouragement of Ms. Dorothy Finley of the U.S. Army Research Institute are gratefully acknowledged. Her comments, with those of Dr. Franklin Moses and Mr. Steven Stewart, contributed significantly to the final version of this document.

AUTOMATED ASSISTANCE FOR FIRE SUPPORT COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE (C^3I)

EXECUTIVE SUMMARY

This report describes and illustrates a methodology to support the formulation and evaluation of automatic data processing (ADP) technologies to assist in the performance of command, control, communications, and intelligence (C^3I) functions. The methodology provides the means for function and task allocation between personnel and the system software so as to better accomplish the system's mission.

The Army, the other services, and industry have all experienced difficulty in designing C^3I system functions and operational concepts to improve the performance of staff operations. To a large extent this problem has been due to the following factors:

- difficulty in conceiving of alternative ways to structure and decompose traditional "manual" information handling tasks;
- limited understanding of what types of tasks or task segments ADP systems can and cannot handle;
- limited understanding of what types of tasks or task segments people do and do not perform well; and
- limited understanding of the "cognitive friction" between people and ADP systems and its implications for man-machine job performance.

The preliminary methodology described in this report has assembled knowledge regarding these issues to produce tools and techniques for use in C^3I system functional design. The core of the methodology contains the following components:

(1) a taxonomy of generic C^3I tasks;

(2) a taxonomy of generic classes of ADP services; and

(3) a matrix describing the potential uses of the ADP services in support of the generic C^3I tasks.

These products can be applied to a specific C^3I function or functional area to describe specific functional and operational characteristics and capabilities for the ADP system. The first step in their application is to develop a hierarchical decomposition of the C^3I function into tasks, subtasks, and activities. The activities are then mapped onto the generic C^3I tasks and through the matrix onto the relevant ADP services. A structured description of the system operation and integration is then developed by

describing the specific information for each task/ADP service pair, and the representation and transformation of that information by the ADP service.

This report illustrates the methodology by including the results of its application to Fire Support C^3I. The results of the trial application supplement the draft Organizational and Operational Plan (O&O Plan) for the Advanced Field Artillery Tactical Data System (AFATDS)[1] by providing analyses and recommendations regarding automated assistance for the Fire Support (FS) C^2 functions. The report includes:

(1) an analysis of the types of services which can be provided by automatic data processing (ADP) systems[2] using low-risk and low-cost hardware and software technologies and the potential use of such services in tactical command control (C^2);

(2) a decomposition of the FS C^2 functions into detailed and elementary subfunctions having limited scopes, simpler objectives, and specific procedures; and

(3) recommendations concerning the use of the ADP services to provide automated assistance to the FS C^2 functions and subfunctions.

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[1] Organizational and Operational Plan for the Advanced Field Artillery Tactical Data System (AFATDS), (Draft) 10 August 1982, U.S. Army Field Artillery School, Fort Sill, Oklahoma.

[2] For the purposes of this report, the term "ADP system" refers to the entire system of computers, I/O peripherals, communications equipment, mass storage units, etc., and all of the associated software which controls the operation and interaction of the hardware. The AFATDS is an example of the system.

CONTENTS

LIST OF EXHIBITS

1.0 INTRODUCTION

This report describes research performed by Vector Research, Incorporated, under the terms of contract number MDA903-81-C-0579 for the US Army Research Institute for the Behavioral and Social Sciences (ARI). The effort described in the report is part of a broader research program intended to develop and demonstrate procedures, guidelines, and data for the definition and evaluation of concepts for the design and operation of ADP systems for Army tactical command control. The research was motivated by historical difficulties in the development, acquisition, and fielding of automated command control systems due to such factors as:

- difficulty in conceiving of alternative ways to structure and decompose traditional "manual" information handling tasks;
- limited understanding of what types of tasks or task segments ADP systems can and cannot handle;
- limited understanding of what types of tasks people do and do not perform well; and
- limited understanding of the "cognitive friction" between people and ADP systems and its implications for man/machine job performance.

1.1 BACKGROUND

The work reported in this document has focused primarily on soldier-machine task allocation and on the role of automation in tactical command control. Soldier-machine task allocation is concerned with defining tasks for the ADP system that will: exploit the capabilities and recognize the limitations of both the ADP system and military personnel; be easily assimilated into the command control organization; provide

an easily recognizable contribution to tactical operations; and provide the flexibility and adaptability required by the diversity of missions, tactical organizations, and tactical situations.

Once a soldier-machine task allocation has been adopted, subsequent stages of the design process include specification of the details of the system operation, engineering specifications, resource sizing, and performance evaluation for the candidate designs. Procedures for resource sizing and performance evaluation have been developed elsewhere (e.g., PAM[1]), but require a sufficiently mature design to warrant or to support their use. Hence, such procedures were not considered in the research reported here.

The methodology described below, and the research from which it was derived were developed to support the Advanced Field Artillery Tactical Data System (AFATDS). At the time the research was performed, the AFATDS was in the preliminary stages of Concept Exploration and there existed a requirement to prepare initial descriptions of how ADP would be used in the system. Those descriptions had to be prepared by personnel with limited expertise in human factors, soldier/machine interfaces, or ADP, but with substantial experience in Fire Support Command Control. Extensive descriptions of data flows had been produced and detailed task subtask decompositions had been prepared. However, limited information was available on the nature of the tasks and subtasks -- particularly with reference to supporting the soldiers who might perform them.

The situation presented an opportunity in the context of the overall research program. It involved consideration of Human Factors issues

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[1]All Source Analysis System Functional System Description (ASAS-FSD) ASAS Performance Assessment Model, (Overview Manual), 1 September 1980, US Army Intelligence Center and School, Fort Huachuca, Arizona.

early in the requirements process (which is recognized to be critical) and provided an opportunity to develop and apply methodologies supporting such considerations (a major goal of the research). On the other hand, time was constrained. As a consequence, development of alternative methodologies and testing was not possible and the research should be viewed with this in mind.

1.2 PROBLEM DESCRIPTION AND APPROACH

The basic problem addressed was to recommend tasks for assignment to the ADP system and services to be provided to the C^2 organization which uses AFATDS. The AFATDS is seen as an ADP system capable of providing a number of basic services. These basic services can be tailored to the specific operational functions and subfunctions in order to accomplish the tasks assigned to the ADP system. The tasks are specific applications of the ADP services in support of particular operational functions and subfunctions. The AFATDS is intended to be a flexible and multi-purpose tool to be used and directed by fire support personnel to expedite the performance of various of C^2 activities.

In order to ensure that the tasks and services recommended report will contribute to the efficiency and effectiveness of the overall C^2 organization and to ensure that the use of the ADP system does not impose a needless burden on the personnel or restrict the versatility of that C^2 organization, the following general guidelines on tasks and services have been used in the preparation of this report. The tasks and services should:

(1) be well within the state-of-the-art and rely only on "proven" hardware and software technologies and, thus, be appropriate

for near-term implementation with low risk and high probability of success;

(2) provide redundancy and alternative means of assisting the C^2 operational functions;

(3) be tailorable and adaptable to diverse situations, units, personnel, etc.;

(4) utilize operating procedures which are similar to those used in the current (manual) mode in order to facilitate smooth transitions between the automated assistance mode and the manual backup mode;

(5) be designed to meet the needs of the C^2 operational functions through subfunctions or component activities;

(6) enable the operational functions to be performed both better and easier than in the manual mode;

(7) be extendable to new operational functions beyond those initially envisioned;

(8) be readily integrated into the fire support organization and operations;

(9) acknowledge and accommodate the function, capabilities, and limitations of the operating personnel;

(10) be easily understood and used by the operating personnel and have a clear contribution to the operational functions;

(11) keep the operating personnel informed and in control of the system, but not burden them with unnecessary information or duties; and

(12) be internally compatible so that they can be combined to perform larger portions of the operational functions.

The first four of the guidelines are particularly important to C^2 applications. The remainder are applicable in general.

The recommendations for the AFATDS basic services and application tasks were developed in three overlapping stages. This program of analysis was designed to ensure that the recommendations conform to the guidelines listed above. The first stage was an analysis of technologically feasible ADP services and their potential contribution to C^2. The second concurrent stage was an analysis of the AFATDS operational functions. The third stage was the description of how the ADP services can be used to assist in the performance of the operational functions and subfunctions. The results of these three stages are summarized briefly in the paragraphs below and described in detail in the appendices to the report.

The objective of the first stage was to develop a catalog of "proven" ADP services and describe their potential uses in C^2 activities. This was accomplished through a review and analysis of the technical literature on ADP systems, the application of ADP systems to tactical C^2 in the Army, Navy, and Air Force, and the application of ADP systems in related areas such as corporate planning, operations, and management. The results are summarized in a descriptive list of "proven" ADP services with applications for tactical C^2, a catalog of generic C^2 tasks, and a matrix relating the ADP services to the generic C^2 tasks. The matrix describes how the services can be used in the C^2 tasks. An example of an ADP service is "mailing". Mailing is essentially an electronic postal service acting in near real-time. In addition to communication processes (storing, forwarding, routing, error correction, acknowledgment, authentication, and security), mailing includes features enabling users to

address and post messages[1] and to scan, retrieve, and purge the contents of their "mailboxes".[2] This service can be used in any C2 task which involves the distribution or transfer of information, but is not appropriate for those tasks requiring bi-directional real-time coordination due to the time required to prepare messages.

The products and results of this first stage of the analysis are presented in appendix C. These are general results and are not restricted to the AFATDS context. However, as the software technology evolves and the experiences of the user communities mature, the results will need to be updated to incorporate new developments.

The objective of the second stage was to provide additional detail to the list of AFATDS operational functions contained in the draft O&O Plan. The draft O&O Plan lists and describes 24 functions organized into five operational categories.[3] The five operational categories are:

(1) Fire Support Control and Coordination;

(2) Target Generation and Processing;

(3) FA Tactical Operations;

(4) FA Technical Fire Direction; and

(5) FA Support and Sustainment.

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[1]Messages may actually be quite lengthy and include both text and graphics. A frag order and an operations order are example messages.

[2]The "mailboxes" are actually computer files, but are conceptually the same as traditional mailboxes.

[3]The draft O&O Plan also discusses a category entitled "Common Functions". As noted in the O&O Plan, this is not a category of operational functions; rather, it is a compendium of system-level functions and capabilities necessary to introduce and support the ADP system. The "Common Functions" are not within the scope of this report.

A consolidated list of functions and subfunctions is presented in appendix A. In appendix D, the 24 functions and their subfunctions are described. For example, the draft O&O category of Support and Sustainment includes the "Ammunition Resupply" function which has been decomposed as reported in appendix D into the following four subfunctions:

(1) obtain ammunition status information;

(2) obtain ammunition resupply capability information;

(3) develop ammunition resupply plans; and

(4) implement ammunition resupply plans.

The subfunctions were derived judgmentally from the discussion in the draft O&O Plan; the doctrinal literature; and the Soldier's Manual for MOS-13F, Fire Support Specialist. These subfunctions were the basis for the recommendations concerning AFATDS operations. The inclusion of Fire Support Specialist tasks is especially important since much of the automated assistance to be provided by AFATDS is currently provided by MOS-13F enlisted personnel (e.g., message handling and updating the fire support situation map). Additionally, building on the MOS-13F task structure ensures that the recommended AFATDS operations are integrated into the fire support organization and operations.

The objective of the third stage was to produce recommendations for describing how the ADP services can be used to assist in the performance of the operational functions and subfunctions. For example, the recommendations describe how the electronic mailing ADP service can be used to assist in the ammunition resupply function and its various subfunctions. The recommendations were developed by: (1) producing a matrix relating the catalog of generic C^2 tasks developed in the first stage to the FS

C^2 operational functions and subfunctions developed in the second stage; and (2) using this matrix in conjunction with the ADP services/ generic C^2 task correlation matrix to describe how the ADP services can be used to support the execution of the operational functions and subfunctions. Again, expert judgment played a principal role in this process to accommodate schedule constraints.

The recommendations for AFATDS are contained in appendix E and provide a basis for the selection of services to be provided by the AFATDS and operational functions to be assisted. The recommendations include operating procedures, message formats, data fields, etc., and specification of such detail should be performed subsequent to selection of the services to be provided by the AFATDS.

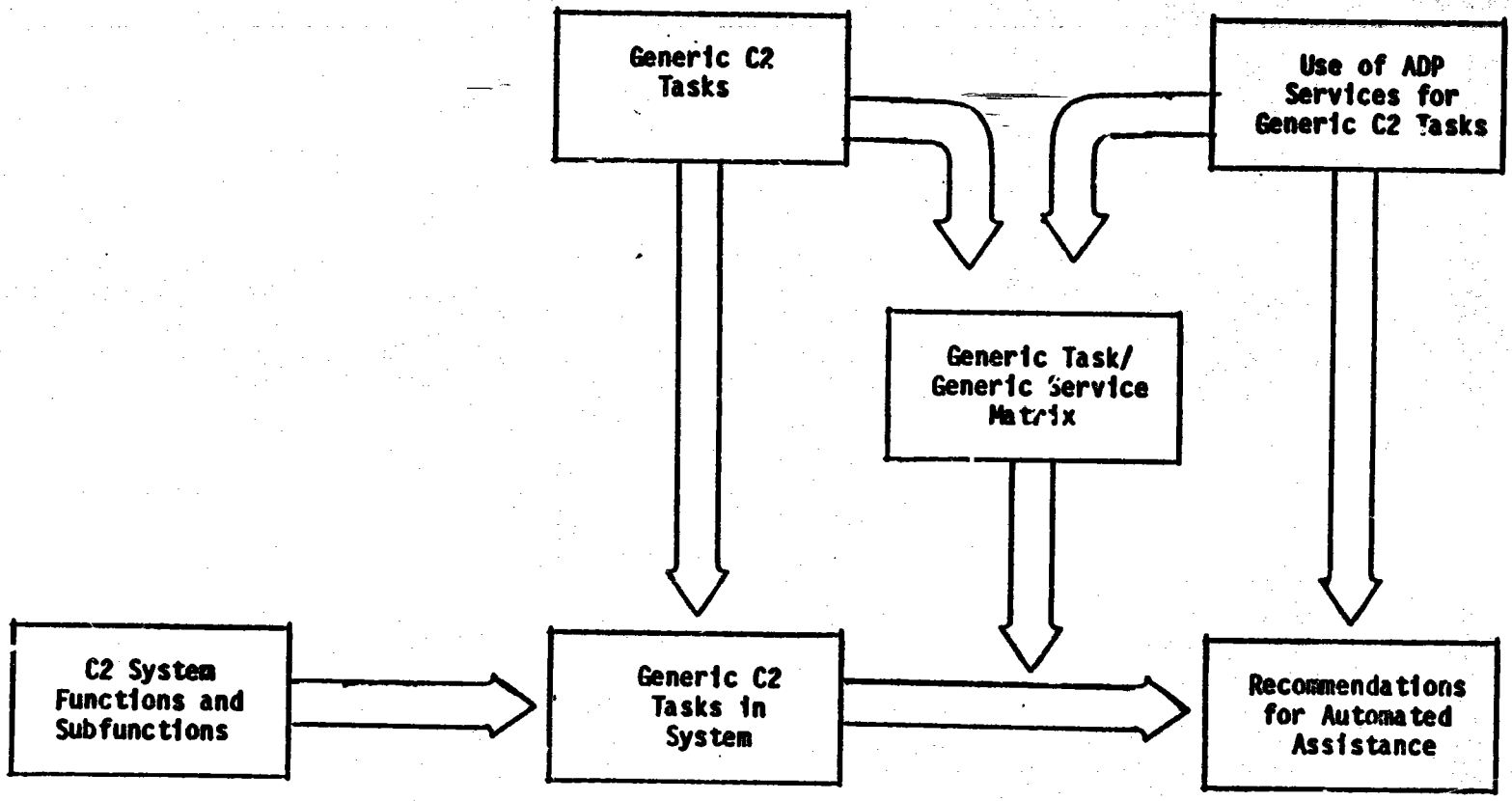
1-3 PRELIMINARY METHODOLOGY FOR SOLDIER/MACHINE TASK ALLOCATION

The structure underlying the methodology developed for and applied to AFATDS is illustrated in exhibit 1-1. The methodology consists of four steps:

(1) Prepare a description and list of the command control functions and subfunctions performed in the system under consideration. Bases from which such descriptions and lists can be developed are available for most systems. However, in the early stages of design the information is likely to be biased toward any existing system and existing MOS. (Appendix A contains such a list for AFATDS.)

(2) Apply a catalog of generic command control tasks to characterize the tasks of the system in question. A variety of schemes which define generic command control tasks have been proposed in the literature, and that chosen for this initial methodology

EXHIBIT 1-1: METHODOLOGY



was selected with application by personnel whose expertise lies in operational command control in mind. The catalog is relatively short and therefore contains broad categories. Exhibit 1-2 illustrates the categories used in the application to AFATDS.

(3) Apply a Generic Task/Generic ADP Service Matrix to define potential ADP applications. A list of generic ADP services is illustrated in exhibit 1-3. The list includes only services which are well within the state of the art, consistent with AFATDS requirements.

The relationships between generic command control tasks and generic ADP services form the basis of a mapping which is described in exhibit 1-4. The matrix entries provide a qualitative statement of the suitability of a service for a task (the absence of an entry indicates lack of suitability).

(4) Prepare recommendations for the use of ADP services for the command control system under consideration using the suitability assessments in the matrix combined with other development considerations.

1.4 RESULTS

The results of the research undertaken to support AFATDS fall into two categories. The first deals with the application to AFATDS -- the recommended uses of ADP services in AFATDS are described in appendix E. The second category includes the development of methodologies to support the consideration of Human Factors in the C3I System design and

EXHIBIT 1-2: TAXONOMY OF C^2 TASKS

LEVEL 1	LEVEL 2	LEVEL 3
CREATE INFORMATION	Collect information	- count - measure - compare - observe - locate
	Monitor Information	- filter - template - scan - listen
PROCESS INFORMATION	Prepare Information	- summarize - overlay - extract - post - combine - edit - sketch - reformat - compute - translate - encode - decode - transcribe - record - update
	Transform Information	- analyze - plan - evaluate - decide - synthesize - hypothesize - explain - predict - project
COMMUNICATE INFORMATION	Disseminate/Obtain Information	- send - receive - identify - authenticate - acknowledge - alert
	Coordinate	- brief - explain - discuss - clarify - question - elaborate - request
	File Information	- organize system - search - sort - store - retrieve - purge

EXHIBIT 1-3: ADP SERVICES

- Interfacing -- collecting data from remote sensors and exchanging data with other tactical data systems.

- Monitoring -- scanning the data stream to check for user-defined data content, and initiating subsequent action.

- Computing and Manipulating Data -- performing mathematical computations, executing algorithms, and manipulating large amounts of data in response to user instructions and queries.

- Preparing Reports -- assisting the preparation of messages, reports, overlays, orders, etc., via multiple services including word processing, graphical display generation, calculator functions, etc.

- Mailing -- providing electronic mail service (in near real time) for combined text/graphics messages. Services include routing, distribution, delivery, hard copy, temporary storage in a "mailbox", scanning the "mailbox", accountability, and authentication.

- Filing -- providing electronic file cabinet operations for text/graphics messages and reports. Operations include labeling files, inserting, retrieving, searching, purging, displaying, and hard copying.

- Graphics Teleconferencing -- audio-visual teleconferencing using computer graphics in conjunction with voice radio teleconferencing to support real-time coordination activities.

EXHIBIT 1-4: GENERIC C^2 TASKS/ADP SERVICES CORRELATION MATRIX

Generic C^2 Tasks	Interfacing	Monitoring	Computing and Manipulating Data	Preparing Reports	Mailing	Filing	Graphics Teleconferencing
	ADP Services						
Collect Information	1,2	1	1	3	1,3	3	2,3
Monitor Information	1	1,2	2	3	1,3		1,3
Prepare Information		1	1	2	3	3	2,3
Transform Information	1	1	2	3	1,3	1,3	1,2,3
Disseminate/Obtain Information	2	2	2	1	2	2	2
Coordinate				1	2	1,3	2
File Information	1	1,2	2	1	1	2	

Code:

1 — ADP service assists in handling input for the C^2 task

2 — ADP service assists in performing the C^2 task

3 — ADP service assists in handling output from the C^2 task

acquisition process. The methodology developed includes three principal components:

(1) a catalog of generic C^2 tasks;

(2) a catalog of generic ADP services; and

(3) a matrix which enables the user to map tasks into appropriate services.

The methodology was applied to the AFATDS and the results were well received. Few questions arose concerning task definitions or the appropriateness of the categorization of ADP services. The level of detail was felt to be appropriate for the early stages of the acquisition process, in this case, Concept Exploration. However, these results must be viewed from a perspective which considers the limited amounts of time and resources that were available, the emphasis on recommendations rather than methodology, and the absence of any formal attempt to evaluate the methodology. Therefore the methodology should be considered to be preliminary nature with further refinement desirable before it is widely used.

1.5 RECOMMENDATIONS

Based on the application of the matrix-based approach to the AFATDS, it is recommended that the approach and associated methodology be a topic for further research. Included in that research should be:

(1) formal evaluation, following review and refinement of the generic tasks and ADP services and preparation of a "users manual";

(2) expansion of scope to include more detailed treatment of human processes supported;

(3) expansion of scope to include consideration of potential advances in the state-of-the-art for ADP services and appropriate test and evaluation; and

(4) provision of greater detail (e.g., cost, risk, utility) in the task service matrix.

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APPENDIX A: CONSOLIDATED LIST OF AFATDS OPERATIONAL FUNCTIONS AND SUBFUNCTIONS

1.0.0 FIRE SUPPORT CONTROL AND COORDINATION

1.1.0 Fire Support Coordination

1.1.1 Monitor FS operations.
1.1.2 Monitor FS capabilities.
1.1.3 Synchronize FS operations with maneuver operations.

1.2.0 Fire Support Planning

1.2.1 Advise maneuver command element on use of FS assets.
1.2.2 Program the allocation of FS assets.
1.2.3 Develop/assign FS tactical missions.
1.2.4 Develop coordination measures.
1.2.5 Disseminate coordination measures.
1.2.6 Explain/clarify commander's guidance.
1.2.7 Obtain target information from the target generation and processing element.
1.2.8 Plan required fires.
1.2.9 Perform FS C^2 processing on submitted targets.
1.2.10 Program the distribution of fires.
1.2.11 Forward targets to appropriate FS agencies and IEW.
1.2.12 Obtain FS plans from each FS agency.
1.2.13 Compile and coordinate the plans from FS agencies.
1.2.14 Distribute the resulting FS plan.
1.2.15 Prepare FS capability overlay.

1.3.0 Fire Support Status

1.3.1 Obtain information on status of allocated resources, including:
- unit location;
- unit strength;
- personnel resources;
- equipment resources;
- unit/weapon readiness;
- unit mobility;
- engagement status; and
- results of enemy engagement.

1.3.2 Compile status information from allocated resources.
1.3.3 Maintain status information.
1.3.4 Update FS situation map.
1.3.5 Update FS status charts.
1.3.6 Distribute status information.

1.4.0 Acquisition, Expansion, and Dissemination of Commander's Guidance

1.4.1 Request commander's guidance as necessary.

1.4.2 Receive commander's guidance concerning:
- conventional, nuclear, chemical target analysis;
- fire planning;
- fire support related combat service support;
- munitions management;
- Targetted Areas of Interest (TAI);
- criteria for engagement of entry elements within TAIs;
- priorities assigned to targets;
- the percent of target coverage and personnel response of engagement by each FS system; and
- specific constraints affecting target analysis.

1.4.3 Record commander's guidance.
1.4.4 Translate the commander's guidance into FS terms.
1.4.5 Amplify the commander's guidance, as appropriate.
1.4.6 Distribute and explain the commander's guidance.

1.5.0 Data Exchange with Maneuver Control System

1.5.1 Monitor task organization.
1.5.2 Monitor tactical missions.
1.5.3 Monitor current tactical situation.
1.5.4 Monitor battlefield geometry.
1.5.5 Monitor future operations or plans.
1.5.6 Transmit recommendations for commander's guidance.
1.5.7 Receive commander's guidance.
1.5.8 Transmit recommendations for use of FS assets.
1.5.9 Transmit acquired ENSIT data.
1.5.10 Transmit FS asset status.
1.5.11 Transmit FS plans and/or orders.
1.5.12 Transmit FS coordination measures.
1.5.13 Receive nuclear release messages.

2.0.0 TARGET GENERATION AND PROCESSING

2.1.0 Target Requirements

2.1.1 Incorporate commander's guidance into target requirements.
2.1.2 Incorporate IEW recommendations into target requirements.
2.1.3 Perform target value analysis.
2.1.4 Determine TAI for target acquisition efforts.
2.1.5 Establish target criteria.
2.1.6 Establish target purging guidance.
2.1.7 Disseminate target requirements.
2.1.8 Synchronize target generation and processing activities with IEW operations.

2.2.0 Sensor Control

2.2.1 Plan sensor deployment and operation.
2.2.2 Implement sensor plans.
2.2.3 Cue sensors.
2.2.4 Process combat data.
2.2.5 Distribute combat data.

2.3.0 Target Processing

2.3.1 Obtain target information.
2.3.2 Compile and integrate target information.
2.3.3 Maintain target information.
2.3.4 Purge targets.
2.3.5 Analyze/identify targets.
2.3.6 Share information with IEW.
2.3.7 Determine recommended targets for attack.
2.3.8 Determine recommended fire units to execute the attack.
2.3.9 Forward target and fire unit recommendations to command element.
2.3.10 Call for fire.

2.4.0 Target Attack Assessment

2.4.1 Obtain fire mission information.
2.4.2 Observe effects of fire.
2.4.3 Report effects of fire.
2.4.4 Measure effects of fire against desired results.
2.4.5 Determine if additional fires needed.
2.4.6 Determine target location/firing adjustments.
2.4.7 Call for fire.

2.5.0 Data Exchange with Intelligence/Electronic Warfare System.

2.5.1 Receive recommended TAI/NAI and other target requirement recommendations.
2.5.2 Receive target recommendations from IEW system.
2.5.3 Transmit plans for sensor deployment.
2.5.4 Transmit target and combat information acquired by field artillery.
2.5.5 Transmit target criteria and other target requirements.
2.5.6 Transmit target attack assessments.

3.0.0 FIELD ARTILLERY OPERATIONS

3.1.0 Field Artillery Status Report

3.1.1 Obtain information on status of allocated resources, including:
- unit location;
- unit strength;
- personnel resources;
- equipment resources;
- unit/weapon readiness;
- unit mobility;

- engagement status; and
- results of enemy fires.

3.1.2 Compile status information from allocated resources.
3.1.3 Maintain status information.
3.1.4 Distribute status information.

3.2.0 Field Artillery Ammunition

3.2.1 Inventory ammunition.
3.2.2 Compile ammunition status information.
3.2.3 Maintain ammunition status information.
3.2.4 Distribute ammunition status information.
3.2.5 Establish warning condition indicators.
3.2.6 Monitor warning condition indicators.

3.3.0 Field Artillery Support Planning

3.3.1 Receive requests for immediate fires.
3.3.2 Select/approve requests for immediate fires.
3.3.3 Designate FA unit for the fire mission.
3.3.4 Plan fires to support scheme of maneuver.
3.3.5 Disseminate fire plans.
3.3.6 Plan ammunition allocation to FA units.
3.3.7 Select registration points.
3.3.8 Plan survey fieldwork.
3.3.9 Collect survey data through fieldwork.
3.3.10 Compute additional survey data.
3.3.11 Maintain survey data.
3.3.12 Distribute survey data.
3.3.13 Collect meteorological data (MET)
3.3.14 Disseminate MET data.
3.3.15 Maintain MET data.
3.3.16 Plan sensor deployment and operation.
3.3.17 Select observation posts.
3.3.18 Implement sensor plans.

3.4.0 Field Artillery Command Control

3.4.1 Obtain FA tactical missions.
3.4.2 Obtain force commander's guidance concerning FA.
3.4.3 Advise FS and maneuver command elements on use of FA assets.
3.4.4 Obtain targets for FA fire plan.
3.4.5 Monitor FA operations.
3.4.6 Monitor FA capabilities.
3.4.7 Synchronize FA operations with maneuver operations.

3.5.0 Generation and Dissemination of Attack Criteria

3.5.1 Incorporate commander's guidance into attack criteria.
3.5.2 Determine attack criteria.
3.5.3 Decide on methods to disseminate attack criteria.
3.5.4 Disseminate attack criteria.

4.0.0 TECHNICAL FIRE DIRECTION

4.1.0 Report Generation

4.1.1 Obtain fire unit status information, including:
- weapon location;
- weapon altitude;
- weapon readiness;
- ammo status;
- personnel status.

4.1.2 Compile fire unit status information.
4.1.3 Maintain fire unit status information.
4.1.4 Distribute fire unit status information.

4.2.0 Computation

4.2.1 Obtain target data, including:
- target location;
- target altitude;
- size of target.

4.2.2 Access stored data on fire units.
4.2.3 Test for violations of tactical geometry.
4.2.4 Compute firing data.
4.2.5 Transmit/implement firing data.

5.0.0 SUPPORT AND SUSTAINMENT

5.1.0 Personnel

5.1.1 Determine status of unit personnel.
5.1.2 Compile unit personnel status information.
5.1.3 Distribute unit personnel status information.
5.1.4 Determine unit requirements for personnel.
5.1.5 Assign and process personnel.
5.1.6 Develop personnel inspection checklists.
5.1.7 Distribute personnel inspection checklists.
5.1.8 Prepare personnel evaluation reports.
5.1.9 Maintain personnel records.

5.2.0 Logistics

5.2.1 Obtain resupply capability information.
5.2.2 Develop resupply plans.
5.2.3 Implement resupply plans.
5.2.4 Plan maintenance/repair activities.
5.2.5 Implement maintenance/repair plans.
5.2.6 Plan equipment recovery.
5.2.7 Implement plans for equipment recovery.
5.2.8 Synchronize FA support and sustainment activities with combat service support operations.

5.3.0 Status Reports

5.3.1 Inventory unit supplies (except class V, ammunition).
5.3.2 Compile inventory information.
5.3.3 Maintain inventory information.
5.3.4 Distribute inventory information.
5.3.5 Establish warning condition indicators.
5.3.6 Monitor warning condition indicators.
5.3.7 Determine supply requirements.
5.3.8 Request resupply.
5.3.9 Determine maintenance/repair requirements.
5.3.10 Request maintenance/repair support.

5.4.0 Ammunition Resupply

5.4.1 Obtain ammunition status information.
5.4.2 Obtain ammunition resupply capability information.
5.4.3 Develop ammunition resupply plans.
5.4.4 Implement ammunition resupply plans.

5.5.0 Reconstitution

5.5.1 Determine personnel and materiel requirements for upgrading unit.
5.5.2 Request required personnel and materiel.
5.5.3 Infuse new personnel into unit.
5.5.4 Supervise unit functioning.

5.6.0 Security

5.6.1 Allocate resources for security activities.
5.6.2 Obtain information from security forces.
5.6.3 Compile and integrate information from security forces.
5.6.4 Determine if breach of security occurs.
5.6.5 Alert appropriate agencies of breach of security.
5.6.6 Exchange information with other security forces.

5.7.0 Data Exchange with Combat Service Support System

5.7.1 Transmit status data regarding:
- supplies;
- ammunition;
- personnel;
- equipment.

5.7.2 Transmit requests for:
- resupply;
- ammunition resupply;
- personnel;
- equipment;
- maintenance support.

5.7.3 Receive plans for combat service support activities.

APPENDIX B: AFATDS OPERATIONAL FUNCTIONS/GENERIC C^2 TASKS CORRELATION MATRIX

This appendix contains a matrix mapping AFATDS functions to generic C^2 tasks. The generic C^2 tasks are listed across the top row, and the AFATDS functions and subfunctions are listed down the left column. For the subfunctions, the cells of the matrix contain keywords indicating the specific aspects of the generic C^2 tasks involved in the subfunction. For the operational functions and the categories of functions, an "X" is used to indicate the generic C^2 task(s) which most closely correspond to the function or category.

EXHIBIT B-1: OPERATIONAL FUNCTIONS/GENERIC C^2 TASKS CORRELATION MATRIX

OPERATIONAL FUNCTIONS	Generic C^2 Tasks: COLLECT INFORMATION	MONITOR	PREPARE INFORMATION	TRANSFORM INFORMATION	DISSEMINATE/ OBTAIN INFORMATION	COORDINATE	FILE INFORMATION
1.0.0 FIRE SUPPORT CONTROL AND COORDINATION						X	
1.1.0 Fire Support Coordination						X	
1.1.1 Monitor FS operations.		MONITOR FS			RECEIVE	DISCUSS	RETRIEVE
1.1.2 Monitor FS capabilities.		MONITOR FS			RECEIVE	DISCUSS	RETRIEVE
1.1.3 Synchronize FS operations with maneuver operations	OBTAIN MCS DATA	MONITOR MANEUVER			SEND FS DATA TO MCS	DISCUSS	
1.2.0 Fire Support Planning				X			
1.2.1 Advise maneuver command element on use of FS assets.			PREPARE		SEND	BRIEF DISCUSS	
1.2.2 Program the allocation of FS assets.				PLAN	SEND	BRIEF	
1.2.3 Develop/assign FS tactical missions.	OBTAIN MCS DATA		PREPARE PLANS/ ORDERS	DECIDE	SEND, RECEIVE	BRIEF	STORE
1.2.4 Develop coordination measures.	OBTAIN MCS DATA		SKETCH OVERLAY	EVALUATE	SEND	EXPLAIN	STORE
1.2.5 Disseminate coordination measures.					SEND		STORE
1.2.6 Explain/clarify commander's guidance.				EXPLAIN	SEND	BRIEF	
1.2.7 Obtain target information from the target generation and processing element.	REQUEST INFORMATION				RECEIVE		STORE

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(Continued)

OPERATIONAL FUNCTIONS	Generic C^2 Tasks: COLLECT INFORMATION	MONITOR	PREPARE INFORMATION	TRANSFORM INFORMATION	DISSEMINATE/ OBTAIN INFORMATION	COORDINATE	FILE INFORMATION
1.2.8 Plan required fires.	FROM MCS AND I/EW		TRANSCRIBE	PLAN			
1.2.9 Perform FS C^2 processing on submitted targets.				ANALYZE			
1.2.10 Program the distribution of fires.				DECIDE	SEND	BRIEF	
1.2.11 Forward targets to appropriate FS agencies and IEW.			PREPARE MSG.		SEND		
1.2.12 Obtain FS plan from each FS agency.	REQUEST PLANS				RECEIVE		STORE
1.2.13 Compile and coordinate the plans from FS agencies.			SUMMARIZE	SYNTHESIZE		CLARIFY, DISCUSS	
1.2.14 Distribute the resulting FS plan.					SEND		STORE
1.2.15 Prepare FS capability overlay.			PREPARE OVERLAY				RETRIEVE
1.3.0 Fire Support Status			X				
1.3.1 Obtain information on status of allocated resources.	COUNT, OBSERVE, LOCATE				REQUEST, RECEIVE		
1.3.2 Compile status information from allocated resources.			SUMMARIZE, EXTRACT				
1.3.3 Maintain status information.		MONITOR STATUS	UPDATE				STORE
1.3.4 Update FS situation map.		MONITOR SITUATION	POST, UPDATE				STORE
1.3.5 Update FS status charts.		MONITOR STATUS	POST, UPDATE				STORE
1.3.6 Distribute status information.					SEND		

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EXHIBIT B-1: OPERATIONAL FUNCTIONS/GENERIC C^2 TASKS CORRELATION MATRIX (Continued)

OPERATIONAL FUNCTIONS	Generic C^2 Tasks: COLLECT INFORMATION	MONITOR	PREPARE INFORMATION	TRANSFORM INFORMATION	DISSEMINATE/ OBTAIN INFORMATION	COORDINATE	FILE INFORMATION
1.4.0 Acquisition, Expansion, and Dissemination of Commander's Guidance						X	
1.4.1 Request commander's guidance as necessary.	REQUEST					EXPLAIN REQUEST	
1.4.2 Receive commander's guidance.	RECEIVE					DISCUSS	STORE
1.4.3 Record commander's guidance.			REFORMAT				STORE
1.4.4 Translate the commander's guidance into FS terms.				SYNTHESIZE			
1.4.5 Amplify the commander's guidance, as appropriate.				EXPLAIN			
1.4.6 Distribute and explain the commander's guidance.			REPORT		SEND	EXPLAIN	
1.5.0 Data Exchange with Maneuver Control System					X		
1.5.1 Monitor task organization.	REQUEST	MONITOR			RECEIVE		STORE
1.5.2 Monitor tactical missions.	REQUEST	MONITOR			RECEIVE		STORE
1.5.3 Monitor current tactical situation.	REQUEST	MONITOR			RECEIVE		STORE
1.5.4 Monitor battlefield geometry.	REQUEST	MONITOR			RECEIVE		STORE
1.5.5 Monitor future operations or plans.		MONITOR			RECEIVE		STORE

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EXHIBIT B-1: OPERATIONAL FUNCTIONS/GENERIC C² TASKS CORRELATION MATRIX (Continued)

OPERATIONAL FUNCTIONS	Generic C² Tasks: COLLECT INFORMATION	MONITOR	PREPARE INFORMATION	TRANSFORM INFORMATION	DISSEMINATE/ OBTAIN INFORMATION	COORDINATE	FILE INFORMATION
1.5.6 Transmit recommendations for commander's guidance.			REPORT		SEND	BRIEF, DISCUSS	STORE, RETRIEVE
1.5.7 Receive commander's guidance.					RECEIVE	DISCUSS	
1.5.8 Transmit recommendations for use of FS assets.			REPORT		SEND	BRIEF, DISCUSS	STORE, RETRIEVE
1.5.9 Transmit acquired ENSIT data.			REPORT	COMPILE	SEND		RETRIEVE
1.5.10 Transmit FS asset status.			REPORT		SEND		STORE, RETRIEVE
1.5.11 Transmit FS plans and/or orders.			REPORT		SEND	BRIEF	STORE, RETRIEVE
1.5.12 Transmit FS coordination measures.			REPORT		SEND		STORE, RETRIEVE
1.5.13 Receive nuclear release messages.					RECEIVE		STORE
2.0.0 TARGET GENERATION AND PROCESSING				X	X		
2.1.0 Target Requirements				X			
2.1.1 Incorporate commander's guidance into target requirements.				SYNTHESIZE			
2.1.2 Incorporate IEW recommendations into target requirements.				SYNTHESIZE			
2.1.3 Perform target value analysis.				ANALYZE, DECIDE			
2.1.4 Determine TAI for target acquisition efforts.				EVALUATE, DECIDE			
2.1.5 Establish target criteria.				EVALUATE, DECIDE			

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EXHIBIT B-1: OPERATIONAL FUNCTIONS/GENERIC C^2 TASKS CORRELATION MATRIX (Continued)

OPERATIONAL FUNCTIONS	COLLECT INFORMATION	MONITOR	PREPARE INFORMATION	TRANSFORM INFORMATION	DISSEMINATE/ OBTAIN INFORMATION	COORDINATE	FILE INFORMATION
	Generic C^2 Tasks						
2.1.6 Establish target purging guidance.				EVALUATE, DECIDE			
2.1.7 Disseminate target requirements.			REPORT		SEND	DISCUSS	STORE
2.1.8 Synchronize target generation and processing activities with IEW operations.	REQUEST I/EW INFO	MONITOR I/EW			RECEIVE, SEND	DISCUSS	
2.2.0 Sensor Control				X	X		
2.2.1 Plan sensor deployment and operation.				PLAN		WITH I/EW	
2.2.2 Implement sensor plans.			DOCUMENT PLANS		SEND		
2.2.3 Cue sensors.	PREPARE TO MONITOR SENSORS			ANALYZE, DECIDE	ALERT		
2.2.4 Process combat data.		MONITOR	REFORMAT	ANALYZE	RECEIVE		
2.2.5 Distribute combat data.					SEND		STORE
2.3.0 Target Processing				X			
2.3.1 Obtain target information.	REQUEST				REQUEST RECEIVE		
2.3.2 Compile and integrate target information.			UNIFIED PRESENTATION	SYNTHESIZE			STORE
2.3.3 Maintain target information.		MONITOR	UPDATE		RECEIVE		STORE
2.3.4 Purge targets.			EDIT				RETRIEVE
2.3.5 Analyze/identify targets.				ANALYZE, HYPOTHESIZE			
2.3.6 Share information with IEW.					SEND	DISCUSS	RETRIEVE
2.3.7 Determine recommended targets for attack.				EVALUATE		DISCUSS	STORE

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EXHIBIT B-1: OPERATIONAL FUNCTIONS/GENERIC C^2 TASKS CORRELATION MATRIX (Continued)

Generic C^2 Tasks

OPERATIONAL FUNCTIONS	COLLECT INFORMATION	MONITOR	PREPARE INFORMATION	TRANSFORM INFORMATION	DISSEMINATE/ OBTAIN INFORMATION	COORDINATE	FILE INFORMATION
2.3.8 Determine recommended five units to execute the attack.				PLAN		DISCUSS	STORE
2.3 9 Forward target and fire unit recommendations to command element.			RECORD		SEND	INFORM	RETRIEVE
2.3.10 Call for fire.			PREPARE		SEND		
2.4.0 Target Attack Assessment				X			
2.4.1 Obtain fire mission information.	REQUEST				RECEIVE		
2.4.2 Observe effects of fire.	OBSERVE						
2.4.3 Report effects of fire.			PREPARE REPORT		SEND		
2.4.4 Measure effects of fire against desired results.				EVALUATE			
2.4.5 Determine if additional fires needed.				DECIDE			
2.4.6 Determine target location/ firing adjustments.	LOCATE			ADJUSTMENT			
2.4.7 Call for fire.			PREPARE		SEND		
2.5.0 Data Exchange with Intelligence/Electronic Warfare System					X		
2.5.1 Receive recommended TAI/HAI and other target requirement recommendations.	REQUEST				RECEIVE	DISCUSS	STORE
2.5.2 Receive target recommendations from I/EW system.		MONITOR			RECEIVE		STORE

-- Continued --

EXHIBIT B-1: OPERATIONAL FUNCTIONS/GENERIC C^2 TASKS CORRELATION MATRIX (Continued)

OPERATIONAL FUNCTIONS	Generic C^2 Tasks: COLLECT INFORMATION	MONITOR	PREPARE INFORMATION	TRANSFORM INFORMATION	DISSEMINATE/ OBTAIN INFORMATION	COORDINATE	FILE INFORMATION
2.5.3 Transmit plans for sensor deployment.					SEND		RETRIEVE
2.5.4 Transmit target and combat information acquired by field artillery.					SEND		RETRIEVE
2.5.5 Transmit target criteria and other target requirements.					SEND		RETRIEVE
2.5.6 Transmit target attack assessments.					SEND		RETRIEVE
3.0.0 FIELD ARTILLERY OPERATIONS				X		X	
3.1.0 Field Artillery Status Report			X				
3.1.1 Obtain information on status of allocated resources.	COUNT, OBSERVE, LOCATE				SEND		STORE, RETRIEVE
3.1.2 Compile status information from allocated resources.			SUMMARIZE, EXTRACT				RETRIEVE
3.1.3 Maintain status information.		MONITOR	UPDATE				STORE
3.1.4 Distribute status information.					SEND		RETRIEVE
3.2.0 Field Artillery Ammunition			X				
3.2.1 Inventory ammunition.	COUNT		REPORT		SEND		
3.2.2 Compile ammunition status information.	REQUEST		SUMMARIZE, EXTRACT				STORE
3.2.3 Maintain ammunition status information.		MONITOR	UPDATE				STORE

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EXHIBIT B-1: OPERATIONAL FUNCTIONS/GENERIC C^2 TASKS CORRELATION MATRIX (Continued)

OPERATIONAL FUNCTIONS	Generic C^2 Tasks: COLLECT INFORMATION	MONITOR	PREPARE INFORMATION	TRANSFORM INFORMATION	DISSEMINATE/ OBTAIN INFORMATION	COORDINATE	FILE INFORMATION
3.2.4 Distribute ammunition status information.					SEND		RETRIEVE
3.2.5 Establish warning condition indicators.			TRANSCRIBE	DECIDE	SEND		STORE
3.2.6 Monitor warning condition indicators.		SCAN, TEMPLATE			ALERT		
3.3.0 Field Artillery Support Planning				X			
3.3.1 Receive requests for immediate fires.		MONITOR			RECEIVE		
3.3.2 Select/approve requests for immediate fires.				DECIDE	INFORM		STORE
3.3.3 Designate FA unit for the fire mission.				DECIDE	INFORM		STORE
3.3.4 Plan fires to support scheme of maneuver.			TRANSCRIBE	PLAN		DISCUSS	STORE
3.3.5 Disseminate fire plans.					SEND		STORE
3.3.6 Plan ammunition allocation to FA units.			REPORT	PLAN			STORE
3.3.7 Select registration points.	LOCATE		REPORT	EVALUATE, DECIDE	SEND		
3.3.8 Plan survey fieldwork.				PLAN	SEND	EXPLAIN	
3.3.9 Collect survey data through fieldwork.	LOCATE				SEND		
3.3.10 Compute additional survey data.			REPORT	COMPUTE			
3.3.11 Maintain survey data.		MONITOR					STORE

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EXHIBIT B-1: OPERATIONAL FUNCTIONS/GENERIC C^2 TASKS CORRELATION MATRIX (Continued)

OPERATIONAL FUNCTIONS	Generic C^2 Tasks: COLLECT INFORMATION	MONITOR	PREPARE INFORMATION	TRANSFORM INFORMATION	DISSEMINATE/ OBTAIN INFORMATION	COORDINATE	FILE INFORMATION
3.3.12 Distribute survey data.					SEND		RETRIEVE
3.3.13 Collect meteorological data (MET)	MEASURE						STORE
3.3.14 Disseminate MET data.					SEND		RETRIEVE
3.3.15 Maintain MET data.			UPDATE				STORE
3.3.16 Plan sensor deployment and operation.				PLAN		DISCUSS	
3.3.17 Select observation posts.	LOCATE			EVALUATE, DECIDE	SEND		
3.3.18 Implement sensor plans.			PREPARE PLANS		SEND	DISCUSS	
3.4.0 Field Artillery Command Control						X	
3.4.1 Obtain FA tactical missions.	REQUEST				RECEIVE	DISCUSS	STORE
3.4.2 Obtain force commander's guidance concerning FA.					RECEIVE	DISCUSS	
3.4.3 Advise FS and maneuver command elements on use of FA assets.						BRIEF, DISCUSS	
3.4.4 Obtain targets for FA fire plan.	REQUEST	MONITOR			RECEIVE		STORE
3.4.5 Monitor FA operations.		TEMPLATE			RECEIVE	DISCUSS	RETRIEVE
3.4.6 Mon.[illegible] FA capabilities.		TEMPLATE			RECEIVE	DISCUSS	RETRIEVE
3.4.7 Synchronize FA operations with maneuver operations	REQUEST DATA	MONITOR OPERATIONS			RECEIVE	DISCUSS	

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EXHIBIT B-1: OPERATIONAL FUNCTIONS/GENERIC C^2 TASKS CORRELATION MATRIX (Continued)

OPERATIONAL FUNCTIONS	Generic C^2 Tasks: COLLECT INFORMATION	MONITOR	PREPARE INFORMATION	TRANSFORM INFORMATION	DISSEMINATE/ OBTAIN INFORMATION	COORDINATE	FILE INFORMATION
3.5.0 Generation and Dissemenation of Attack Criteria				X			
3.5.1 Incorporate commander's guidance into attack criteria.				SYNTHESIZE			
3.5.2 Determine attack criteria.				EVALUATE, DECIDE			
3.5.3 Decide on methods to disseminate attack criteria.				EVALUATE, DECIDE			
3.5.4 Disseminate attack criteria.			PREPARE		SEND	DISCUSS	STORE, RETRIEVE
4.0.0 TECHNICAL FIRE DIRECTION			X				
4.1.0 Report Generation			X				
4.1.1 Obtain fire unit status information.	REQUEST	MONITOR			RECEIVE		STORE
4.1.2 Compile fire unit status information.			SUMMARIZE, EXTRACT	AGGREGATE			RETRIEVE
4.1.3 Maintain fire unit status information.		MONITOR	UPDATE				STORE
4.1.4 Distribute fire unit status information.			REPORT		SEND		STORE, RETRIEVE
4.2.0 Computation			X				
4.2.1 Obtain target data.					RECEIVE		STORE
4.2.2 Access stored data on fire units.							RETRIEVE
4.2.3 Test for violations of tactical geometry.				COMPARE, EVALUATE	ALERT		

-- Continued --

EXHIBIT B-1: OPERATIONAL FUNCTIONS/GENERIC C^2 TASKS CORRELATION MATRIX (Continued)

OPERATIONAL FUNCTIONS	Generic C^2 Tasks: COLLECT INFORMATION	AUDITOR	PREPARE INFORMATION	TRANSFORM INFORMATION	DISSEMINATE/ OBTAIN INFORMATION	COORDINATE	FILE INFORMATION
4.2.4 Compute firing data.				COMPUTE			
4.2.5 Transmit/implement firing data.					SEND		
5.0.0 SUPPORT AND SUSTAINMENT			X	X		X	
5.1.0 Personnel			X	X			
5.1.1 Determine status of unit personnel.	OBSERVE		REPORT		RECEIVE		RETRIEVE
5.1.2 Compile unit personnel status information.			SUMMARIZE, EXTRACT				STORE
5.1.3 Distribute unit personnel status information.					SEND		RETRIEVE
5.1.4 Determine unit requirements for personnel.				EVALUATE PREDICT			
5.1.5 Assign and process personnel.			ORDERS	DECIDE	SEND		STORE
5.1.6 Develop personnel inspection checklists.			RECORD	PLAN			STORE
5.1.7 Distribute personnel inspection checklists.					SEND		RETRIEVE
5.1.8 Prepare personnel evaluation reports.			REPORT	EVALUATE			
5.1.9 Maintain personnel records.			UPDATE				PURGE, STORE, RETRIEVE
5.2.0 Logistics				X		X	
5.2.1 Obtain resupply capability information.	REQUEST		REPORT		SEND, RECEIVE		RETRIEVE, STORE

-- Continued --

EXHIBIT B-1: OPERATIONAL FUNCTIONS/GENERIC C^2 TASKS CORRELATION MATRIX (Continued)

OPERATIONAL FUNCTIONS	Generic C^2 Tasks: COLLECT INFORMATION	MONITOR	PREPARE INFORMATION	TRANSFORM INFORMATION	DISSEMINATE/ OBTAIN INFORMATION	COORDINATE	FILE INFORMATION
5.2.2 Develop resupply plans.				PLAN		DISCUSS	RETRIEVE DATA
5.2.3 Implement resupply plans.			ORDERS			BRIEF	STORE
5.2.4 Plan maintenance/repair activities.				PLAN		DISCUSS	
5.2.5 Implement maintenance/ repair plans.			ORDERS			BRIEF	
5.2.6 Plan equipment recovery.				PLAN		DISCUSS	
5.2.7 Implement plans for equipment recovery.			ORDERS			BRIEF	
5.2.8 Synchronize FA support and sustainment activities with combat service support operations.	REQUEST DATA	MONITOR CSS OPS			INFORM CSS OF FA OPS	DISCUSS	
5.3.0 Status Reports			X	X			
5.3.1 Inventory unit supplies (except class V, ammunition).	COUNT, OBSERVE, MEASURE		REPORT				
5.3.2 Compile inventory information.			SUMMARIZE, EXTRACT	AGGREGATE			
5.3.3 Maintain inventory information.		MONITOR	UPDATE				PURGE, STORE, RETRIEVE
5.3.4 Distribute inventory information.					SEND		RETRIEVE
5.3.5 Establish warning condition indicators			DOCUMENT	DECIDE	SEND		STORE

-- Continued --

EXHIBIT B-1: OPERATIONAL FUNCTIONS/GENERIC C^2 TASKS CORRELATION MATRIX (Continued)

OPERATIONAL FUNCTIONS	Generic C^2 Tasks: COLLECT INFORMATION	MONITOR	PREPARE INFORMATION	TRANSFORM INFORMATION	DISSEMINATE/ OBTAIN INFORMATION	COORDINATE	FILE INFORMATION
5.3.6 Monitor warning condition indicators.	REQUEST DATA	SCAN, TEMPLATE			ALERT		
5.3.7 Determine supply requirements.	REQUEST DATA			EVALUATE, PREDICT			
5.3.8 Request resupply.			MESSAGE		SEND		
5.3.9 Determine maintenance/repair requirements.				EVALUATE, PREDICT			
5.3.10 Request maintenance/repair support.			RECORD		SEND	DISCUSS	
				X		X	
5.4.0 Ammunition Resupply							
5.4.1 Obtain ammunition status information.	REQUEST				RECEIVE		RETRIEVE
5.4.2 Obtain ammunition capability information.	REQUEST				RECEIVE		RETRIEVE, STORE
5.4.3 Develop ammunition resupply plans.			DOCUMENT	PLAN		DISCUSS	
5.4.4 Implement ammunition resupply plans.			ORDERS		SEND	BRIEF	STORE
				X		X	
5.5.0 Reconstitution							
5.5.1 Determine personnel and materiel requirements for upgrading unit.	REQUEST			EVALUATE			RETRIEVE
5.5.2 Request required personnel and materiel.			REPORT		SEND		STORE
5.5.3 Infuse new personnel into unit.			ORDERS		SEND	DISCUSS	

-- Continued --

EXHIBIT B-1: OPERATIONAL FUNCTIONS/GENERIC C^2 TASKS CORRELATION MATRIX (Concluded)

OPERATIONAL FUNCTIONS	Generic C^2 Tasks: COLLECT INFORMATION	MONITOR	PREPARE INFORMATION	TRANSFORM INFORMATION	DISSEMINATE/ OBTAIN INFORMATION	COORDINATE	FILE INFORMATION
5.5.4 Supervise unit functioning.	REQUEST	MONITOR OPS		EVALUATE		DISCUSS	
5.6.0 Security				X		X	
5.6.1 Allocate resources for security activities.			PLANS, ORDERS	DECIDE		DISCUSS	STORE
5.6.2 Obtain information from security forces.					RECEIVE	DISCUSS	
5.6.3 Compile and integrate information from security forces.			COMBINE	SYNTHESIZE			
5.6.4 Determine if breach of security occurs.		DATA		ANALYZE, DECIDE	ALERT		
5.6.5 Alert appropriate agencies of breach of security.			PREPARE ALERT		ALERT	DISCUSS	
5.6.6 Exchange information with other security forces.	REQUEST		PREPARE MSG.		SEND, RECEIVE	DISCUSS	STORE, RETRIEVE
5.7.0 Data Exchange with Combat Service Support					X		
5.7.1 Transmit status data.			FORMAT		SEND		RETRIEVE
5.7.2 Transmit requests for support.			FORMAT	PREPARE	SEND		STORE
5.7.3 Receive plans for combat service support activities.	REQUEST			COMPARE WITH REQUIREMENTS	RECEIVE		STORE

APPENDIX C: ADP SERVICES FOR C^2 APPLICATIONS

This appendix describes ADP that directly assists the types of tasks performed in the tactical command control setting and that are within the current limits of hardware and software technologies. This appendix also introduces a classification scheme for C^2 tasks and relates the resulting categories of C^2 tasks to the ADP services.

ADP services can be defined as user-oriented applications of computer/communications technology; they are services provided to the user and should not be confused with the mechanisms for accomplishing the services. For example, a service provided by an electric hand drill is to create holes for screws in wood or metal, but the mechanism for accomplishing this is the rotation of a drill bit. Similarly, the service provided by a fire extinguisher is to extinguish small fires, but the underlying mechanism is to spray a nonflammable foam filled with carbon dioxide bubbles. A tool is usually selected for use in a particular task because of the service it provides to task performance, and the underlying mechanism of the tool is of secondary importance to the user.

This holds true for ADP systems as well as simple tools. The ADP system is no more than a multi-service tool for handling information. It is essential, when developing an ADP system such as AFATDS, to understand the types of services provided by ADP systems and the relation of these services to the command control tasks. Unfortunately, due to the relatively recent introduction of ADP systems and the continuing fascination with the mechanisms of performance and with state-of-the-art technology, such an understanding of the ADP services and their roles in the application tasks has been lacking in the designs of both business and military

information systems. This has often led to difficulties in design specification and to dissatisfaction with the eventual product.

Section C.1 of this appendix describes seven major categories of ADP services and the components of each category. Section C.2 provides a three-layer hierarchical categorization scheme (a taxonomy) for C^2 tasks. These tasks are generic activities (e.g., file a report) which are performed in a variety of specific functions or subfunctions (e.g., file the ammunition status report). Specific functions or subfunctions can be readily mapped to the generic C^2 tasks. The FS C^2 operational functions are mapped to the generic tasks in appendix B. Section C.2 also contains a matrix that relates the ADP services to the generic tasks and describes how the services can assist in the performance of the tasks. This matrix was used to prepare the recommendations contained in appendix E identifying potential roles of the ADP services in the performance of FS C^2 operational functions.

C.1 ADP SERVICES

Seven categories of ADP services were identified as particularly relevant to tactical command control. These services were listed and briefly summarized in exhibit 1-3. These categories were developed after an extensive review of the technical literature on ADP system design and ADP application to command control and related areas such as corporate management and operations. The major objectives of this review were to classify the types of ADP services, identify their applications in organizational and work station settings, and determine their implications and requirements regarding operators, hardware, and software. The literature review focused on actual, not theoretical, systems. Meaningful results

and observations cannot be extracted from theoretical and "in-progress" systems. Any ADP service that required unproven, experimental hardware or software technology was deemed unsuitable for near-term AFATDS application.

The seven classes of services fall into two groups. The first three services listed in exhibit 1-3 are configured and initiated by the user, but are thereafter largely automated. The remaining four services are highly user interactive. The services and their components and variations are described in the following sections.

C.1.1 INTERFACING

The interfacing service refers to collecting data from sensors and exchanging data and queries with other tactical data systems. When collecting data from sensors and similar devices (such as equipment status indicators) the data are received, formatted into appropriate data messages, and entered into the system with appropriate encoding and routing information. When receiving data or queries from another data system, the messages are received, acknowledged, and authenticated. Format translation may be required to accomodate inter-system differences.

Records are maintained of data exchange with other ADP systems. A mechanism must be provided for users to direct data and queries to other systems. When transmitting data and queries to other systems, reformatting may be required prior to transmission. A record of outstanding queries is maintained.

C.1.2 MONITORING

Monitoring refers to scanning the data/message flow to check for user-specified conditions and initiating subsequent action as per user

specifications. A mechanism is provided for users to establish, review, alter, or delete the monitoring test criteria and instructions for subsequent action.

Monitoring is essentially a templating process. Three varieties of monitoring templates can be used. The simplest variety is a template in which individual messages are examined against a static template. The template specifies particular pieces of information to be looked for in various data fields, such as particular message types from certain sources or particular keywords in the message text. The other two varieties of templates are dynamic rather than static. One form of dynamic template specifies the necessary relationship between the message and a database. The second type of dynamic template looks for sequences of messages. This type of template actually consists of a number of static templates; when all of the component templates have been filled, the overall template is complete. In this variety, the overall template may also have the capability to empty some of the component templates, based on purging criteria such as elapsed time (e.g., overall templates must be filled within five minutes) or some other static template (if X is observed after Y, then unfill the template for Y).

When a template is filled, some prespecified action is initiated. A variety of processes may be initiated by the monitoring process. These include but are not limited to:

(1) routing the message just received or a prepared message to one or more users, or to another tactical data system;

(2) initiating some computation or database processing; or

(3) updating a display.

C.1.3 COMPUTING AND MANIPULATING DATA

ADP systems possess the ability to perform extensive mathematical computations rapidly and accurately, execute complex logical algorithms, and manipulate large amounts of data. This service has the following three components:

(1) an instruction/query language which enables the user to express his information needs easily and accurately;

(2) output formats including tables, text, and graphics which present the results in an easily and rapidly understood form; and

(3) algorithms, equations, and database organization which enable the system to produce the desired results accurately and rapidly.

In order to define these features in sufficient detail for software development, the requirements for computation and data manipulation must be accurately and completely specified. For AFATDS this would involve detailed analysis of the individual operational subfunctions which involve computation or data manipulation, which is beyond the scope of this report. However, in appendix E those subfunctions which could be facilitated by automated computation and data manipulation services are identified.

C.1.4 PREPARING REPORTS

Assistance in preparing or updating reports, orders, overlays, messages, workbooks, logs, journals, maps, charts, etc., incorporates a variety of subservices such as word processing, graphical display generation, and calculator functions. Naturally, preparing reports is a highly interactive process. The user is provided the capability to access other

services while preparing reports; e.g., to issue a query or instruction and include the response in the report, or to retrieve a copy of a form and use the text editing capabilities to fill in the blanks. Menu selection may be desirable for some situations, e.g., filling out report or message forms. The user is able to print the final product or transfer it to another service for filing or mailing. To provide sufficient flexibility to adapt to different units, users should be able to establish their own report forms, message forms, etc.

C.1.5 MAILING

Mailing is essentially an electronic postal service. With this service the user can send a "letter" to a designated addressee or group of addressees. The "letter" is a digital message which may include graphics, standard text, or preformatted sections. The user is able to specify an addressee or attach a distribution list for a group of addressees. The communications issues (filling out header information, routing, encryption/decryption, error detection and correction, acknowledgment, authentication, etc.) are all handled automatically and are invisible to the user. For the sender, the system maintains a list of the mailings and their current status, i.e., whether or not they have arrived at their destination and, if so, when.

The mailings are deposited automatically in the addressee's "mailbox." If the addressee relocates, he may specify a temporary address, in which case mail is automatically forwarded. The "mailbox" is actually a file in the sense of the filing service discussed in section C.1.6. Anyone can post a "letter" to an addressee's mailbox, but only someone with the appropriate password should be able to scan, display, print, or

purge mail. The mailing service should allow the user to scan the contents of the mailbox, i.e., display the source, time of receipt, and title or first line of each item. The addressee should be able to select items from the mailbox, and have them displayed, hard copied, forwarded to another addressee, purged, or moved to another file.

C.1.6 FILING

The filing service consists essentially of electronic file cabinet operations. The user is able to organize his own filing system, i.e., he can name "drawers" of the "file cabinet" and designate any header information, such as title, keywords, date, etc., for scanning, sorting, and summarizing. The user is able to insert material (a "letter" in the sense of the mailing service described in section C.1.5) into a designated file, retrieve material from a file, purge material from a file, and scan the contents of a file. Scanning the file contents should enable the user to list the titles of the contents based on order of insertion, header information, or keywords in the material. The user should be able to monitor the file contents, including the number of entries and the file space utilized. A user can permit access to other users, including read-only access, write-only access, and full access. When a user retrieves materiel, he can display it, print it, or use it in some other service such as mailing, graphics teleconferencing, etc.

C.1.7 GRAPHICS TELECONFERENCING

Audio-visual teleconferencing using computer graphics is a relatively recent application, based on well-understood technology, which allows subscribers at several remote locations to view simultaneously,

discuss, and modify a chart, map, overlay, or other display.[1] In this application, the AOP system acts primarily as an "electronic blackboard" which can be viewed by or drawn on at any node in the network and which is accompanied by voice radio teleconferencing. The voice and data signals can be easily multiplexed over the same communication link.

In addition to manual drawing, pointing, moving symbols, and erasing, the system should provide facilities for keyboard text entry, for graphics creation and modification from the database, and for the display of material retrieved from files. This service has applications for planning sessions, briefings, and any other real-time coordination activities.

A form of graphics teleconferencing for a distributed command post has been in use at III Corps, Fort Hood, Texas. The III Corps system is based on television technology and is likely to be infeasible for battlefield applications due to communications constraints. The television-based system also does not provide computer support capabilities. However, it has demonstrated the value of the teleconferencing concept.

C.2 C^2 TASKS

This section describes a catalog (a hierarchical classification scheme, or taxonomy) for generic C^2 tasks. The generic tasks are activities commonly performed in operational functions, but independent of the specific subject matter.

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[1] A demonstration system providing this service is available for demonstration at ARI headquarters in Alexandria, Virginia.

The concept of generic C^2 tasks is useful because many operational functions or subfunctions involve these common tasks applied to different subject areas. For example, preparing a unit status report and preparing an ammunition status report both involve preparing a report. By identifying the ADP services that pertain to report preparation, the role of ADP services in all operational functions that require reporting is defined. Final specification of the services for each operational function need only address subject-matter-specific issues such as the standard data that are provided in a unit status report as opposed to the standard data provided in an ammunition status report.

The taxonomy of generic C^2 tasks was summarized in exhibit 1-2. The classification scheme has three levels of detail. At the first level, C^2 tasks are grouped into three general categories. The second level presents seven categories that are more specific and encompass a broad range of C^2 tasks. The third, most detailed level, while not necessarily complete for all C^2 settings, appears to cover the range of tasks involved in the AFATDS operational functions.

The roles of the ADP services in supporting the generic C^2 tasks were analyzed, and the results of this analysis were used to prepare the recommendations for the roles of the ADP services in support of the AFATDS operational functions and subfunctions presented in appendix E. Exhibit 1-4 presented a matrix summarizing the relations among the seven categories of generic C^2 tasks in the second level of the taxonomy and the seven ADP services. The following seven subsections present the component subtasks, the relations to the AFATDS operational functions, and the types of automated assistance offered by the ADP services.

C.2.1 COLLECT INFORMATION

Selected C^2 activities are aimed at collecting new information pertaining to the status of the battle. These activities create new information for use in command control. Generally, information collection tasks are goal directed, i.e., their purpose is to discover some specific type of information about some geographic or functional area of the battlefield.

Fire Support C^2 includes both elementary subfunctions and more complex functions which are primarily oriented toward collecting information. Examples of elementary information collection subfunctions are to inventory (count) ammunition and to assess the effects of fire. The purpose of sensor control is also to collect information, but sensor control is a more complex operational function and is composed of elementary subfunctions. Sensor control includes subfunctions such as planning sensor deployment, implementing sensor plans, and others (see section D.2.2) which do not, by themselves, collect information but which, when taken together, collect sensor information.

The ADP services provide extensive and multifaceted support to this task. Interfacing supports information collection activities by: (1) collecting data directly from sensors; and (2) enabling users to seek and retrieve data from other systems. Monitoring and computing and manipulating data support information collection activities by providing inputs to assist the user in determining what information needs to be collected. (This type of support is especially important in complex information collection activities such as sensor control.) Preparing reports, mailing, and filing all provide assistance by enabling users to: (1) ask for information from other users; and (2) convert information

from mental recall into forms useful to the system and other users. Graphics teleconferencing also offers a means to: (1) collect complex information (e.g., contingency plans and rationale) directly from other users; (2) direct others to collect information; and (3) report results.

C.2.2 MONITOR INFORMATION

Monitoring information refers to those activities whose objectives are to be continually cognizant of developments on the battlefield and to initiate responsive action as appropriate. These activities identify important developments by scanning, filtering, templating, comparing, and otherwise assessing the significance of the information flowing through the command control complex. Generally, information monitoring tasks are concerned with a particular geographic or functional area, are primed to respond to relatively well-defined conditions, and have well-defined response actions (e.g., notify someone else, or begin to implement a contingency plan).

Examples of information monitoring tasks drawn from the fire support subfunctions include monitoring fire support operations and monitoring warning condition indicators for ammunition resupply. In monitoring fire support operations, one is checking for the completion of operations as well as indications of difficulties in the operations. Since the indications of difficulties cannot, in general, be precisely formulated in advance, this case of monitoring does not lend itself to full automation. Some automated support -- such as message flagging based on keywords, message types, and areas of interest -- could provide assistance. On the other hand, monitoring ammunition resupply warning condition indicators

involves a mathematical relation among the current ammunition inventories, basic load, and possibly other factors such as transport capabilities, transport times, movement plans, and firing plans. Since this can be formulated as a mathematical relation, albeit complex, it is suitable for almost total automation.

The ADP services can provide several forms of assistance to information monitoring functions. The interfacing, monitoring, mailing, and graphics teleconferencing services all provide information to be monitored. The monitoring service can actually perform information monitoring if the criteria and response actions can be clearly specified. Computing and data manipulation services can support information monitoring tasks by assisting in evaluating the significance of the observed conditions. Preparing reports, mailing, and graphics teleconferencing are all means to initiate response actions.

C.2.3 PREPARE INFORMATION

Preparing information refers to those activities which change the form of information or which combine it with other information to facilitate its use, manipulation, or storage. Some of these activities are fairly elementary or routine such as updating a situation map (which could be done automatically if the situation map were on a video display), while others, such as summarizing a series of messages or extracting critical facts, are complex and can be assisted by ADP, but not fully automated.

Many command control activities fall into this category. These include preparing overlays, updating situation maps, preparing messages

or reports, etc. There are numerous examples in fire support C^2, many of them performed by the fire support specialists rather than officers.

Two ADP services, monitoring data and computing and manipulating data, can be used to provide the raw information to be prepared. The various subservices of preparing reports (word processsing, graphics manipulation, hard copy production, etc.) assist directly in preparing information. Mailing and filing help handle the prepared information. Graphics teleconferencing can be used to prepare and display information concurrently to several users.

C.2.4 TRANSFORM INFORMATION

Transforming information refers to those activities which use current situation information in conjunction with special skills, expertise, and background knowledge to produce a new and radically different information product. A prime example is the use of enemy situation and friendly situation information to prepare a defense plan. Information transformation tasks generally require extensive background experience and sophisticated planning and decisionmaking skills. They are typically performed by experienced personnel and, although they can be assisted with automated support, full automation in the near-term is unlikely.

Examples of information transformation in fire support C^2 are found extensively in fire support and field artillery planning. Specific examples include programming the distribution of fires and developing the fire plan.

ADP services support information transformation tasks primarily by providing input information and by providing the means to handle the information product. Interfacing, monitoring, mailing, filing, and

graphics teleconferencing all provide raw input information. Preparing reports, mailing, filing, and graphics teleconferencing all provide means to handle the output. Computing and manipulating data can in some situations provide decision support capabilities which actually help the user perform the information transformation, i.e., develop a plan or evaluate alternatives. Information transformation tasks are sometimes performed in a group, e.g., the detailing and elaboration of a concept of operations. In these cases, when the participants are at several different locations, graphics teleconferencing is of direct assistance.

C.2.5 DISSEMINATE/OBTAIN INFORMATION

Disseminating and obtaining information refers to activities whose purposes are to inform one or more subscribers of certain information, but where two-party coordination is not required to understand the information. This type of information includes factual data (e.g., battlefield situation data, reports, or messages) and instructions (e.g., frag orders or commander's guidance). In disseminating information, the information is pushed forward to the destinations, but recipients at the destinations are not necessarily aware that information is being sent to them until it arrives. In obtaining information, one decides that certain information is needed and attempts to obtain it from any possible source. Specific tasks may involve elements of both disseminating and obtaining.

Examples of disseminating information in fire support C^2 include requesting unit status information and disseminating target requirements. Examples of obtaining information in fire support C^2 include collecting survey data and requesting logistics resupply capability information.

ADP services have a high potential to assist in disseminating and obtaining information. Interfacing disseminates data from sensors and other ADP systems and allows users to obtain information from the other ADP systems. Monitoring can be used to ensure that a user obtains specified information as soon as it is available. Preparing reports assists users in preparing information packages to disseminate and to prepare requests to obtain information. Mailing is of obvious utility in distributing and requesting information. Computing and manipulating data allows users to update the database (distribute) and to query the database (obtain). Filing enables the user to scan his files or other users' files to obtain information. Lastly, graphics teleconferencing is a means to both disseminate and obtain information via voice and graphics.

C.2.6 COORDINATE

Coordinating refers to those activities whose purpose is either to enable fire support personnel to achieve a common understanding of the battlefield situation, plans, and contingencies or to ensure that plans and operations are based on a unified set of priorities and objectives. Coordination among the personnel of the various functional areas (fire support, maneuver, intelligence/electronic warfare, logistics, and air defense) and among the various elements of fire support is essential to achieve effective, concentrated combat power and to efficiently utilize available resources.

Examples of coordination activities in fire support C^2 include allocation of fire support assets, and distribution and explanation of the commander's guidance. The former is a case where a central location produces a coordinated plan using inputs from other locations, but not

necessarily involving their participation. The latter is a case where active two-party or multi-party interaction is predominant.

The ADP services of preparing reports, mailing, and filing all facilitate coordination whether it be the central integration of separately developed plans and requests or the two-party interaction needed to develop a common understanding. Graphics teleconferencing is highly useful when multi-party coordination or synchronized activity is needed.

C.2.7 FILE INFORMATION

Filing information refers to those activities whose purpose is to store and retrieve information for future use. No particular type of storage is implied. Information may be filed on a situation map where it is in full view, in a journal or workbook, in a file cabinet, or in a computer file or database. Filing includes the component activities of organizing the filing system, inserting, updating, searching, sorting, retrieving, and purging.

Examples of information filing activities in fire support C^2 include updating the fire support status chart, maintaining target information, and many other related subfunctions.

The ADP services of interfacing, monitoring, preparing reports, and mailing all provide information to be filed. Computing and manipulating data enable the user to update or query the database. Also, monitoring may initiate an automatic database update or query. Lastly, the filing service itself enables the user to use the ADP system like an electronic file cabinet, i.e., with this service he can organize his own filing system, establish keywords for searching and sorting, insert, retrieve, and purge.

APPENDIX D: AFATDS OPERATIONAL FUNCTIONS

The AFATDS concept of operations contained in the draft O&O Plan describes 24 operational functions organized into five operational categories. These functions are, in general, complex multi-stage activities requiring operators with a variety of skills and resources for their completion. In order to evaluate the potential role of automated assistance, the functions were decomposed into subfunctions that have more limited scope, simpler objectives, and more specific procedures. These subfunctions are the basis for recommendations regarding AFATDS automated assistance.

The subfunctions were derived from the descriptions of the functions in the draft O&O Plan, the Army Fire Support doctrinal literature, and the Soldier's Manual for the Fire Support Specialist, MOS-13F. The definition of the subfunctions followed five general guidelines. First, the subfunctions were defined so that they roughly corresponded in complexity and type of activity to the categories of generic C^2 tasks and ADP services described in appendix C. Second, each subfunction was defined to focus on a single objective and subject area. Third, details of formats and specific procedures were <u>not</u> incorporated into the subfunction descriptions since the specification of these details would depend on the role and type of automated assistance. Fourth, activities using the same inputs and involving the same type of processing were not separated into distinct subfunctions. Fifth and last, wherever possible the subfunctions were designed to correspond to existing tasks of the Fire Support Specialist (MOS-13F) so that integration into the C^2 organization and transitions between the automated assistance mode of

operations and manual backup mode of operations would be facilitated. No attempt was made to avoid overlap or redundancy among the subfunctions since these are desirable characteristics providing flexibility and adaptability in command control.

The subfunctions are described in the remainder of this appendix. Their presentation is organized by the categories and functions of the draft O&O Plan. A composite list of the categories, functions, and subfunctions is contained in appendix A.

D.1 FIRE SUPPORT CONTROL AND COORDINATION

This category consists of the functions required to control and coordinate fire support, which include field artillery, close air support, naval gunfire, and US Air Force support. The category contains functions for the integration of fire support with the scheme of maneuver and functions for the control and coordination of the various fire support agencies. The O&O Plan delineates five such functions:

- Fire Support Coordination -- coordination of fire support with maneuver to achieve optimum support of the scheme of maneuver within the constraints of the environment;
- Fire Support Planning -- allocation, distribution, and coordination of fire support assets, including field artillery, close air support, naval gunfire, and US Air Force support;
- Fire Support Status -- management of information regarding the status of fire support assets;
- Acquisition, Expansion, and Dissemination of Commander's Guidance -- management of the force commander's guidance concerning fire support operations; and

- Data Exchange with Maneuver Control System -- exchange of required data between fire support and maneuver.

The components of each of these functions are discussed in the following five sections.

D.1.1 FIRE SUPPORT COORDINATION

Fire support coordination includes the following three subfunctions:

- Monitor fire support operations. The fire support command element monitors the execution of the current fire support operations and the outcomes of completed operations in order to determine the need to revise plans, commit additional resources, and inform maneuver of battle outcomes.
- Monitor fire support capabilities. The fire support command element must be aware of the capabilities of fire support units to operate and to accomplish missions in order to determine the ability of fire support to facilitate a scheme of maneuver and to develop the fire support plan.
- Synchronize fire support operations with maneuver operations. Real-time communication between the fire support and maneuver command elements is required to synchronize operations.

D.1.2 FIRE SUPPORT PLANNING

Fire support planning includes the following 15 subfunctions:

- Advise maneuver command element or use of fire support assets. The fire support coordinator (FSCOORD) and the fire support command element advise the force commander and his staff on all fire support matters concerning the delivery of fire on targets and

the use of artillery target acquisition assets. The FSCOORD and the force G3 (S3) work together to integrate fire and maneuver.

- Program the allocation of fire support assets. The fire support command element develops recommendations for the allocation of fire support assets, coordinates the recommendations with the maneuver commander and his staff, and disseminates the resulting tactical missions to appropriate fire support agencies.
- Develop/assign fire support tactical missions. The force commander assigns tactical missions to fire support units based on the recommendations developed by the FSCOORD and staff. Standard tactical missions include general support, general support-reinforcing, reinforcing, and direct support.
- Develop coordination measures. Recommendations for coordination measures to support the scheme of maneuver (e.g., establishing fire support coordination lines) are developed. The effect of particular coordination measures, such as a coordinated fire line, on tactical operations is evaluated and the need for coordination measures is determined. The recommended coordination measures are plotted and given to the maneuver commander for establishment.
- Disseminate coordination measures. Coordination measures established by the maneuver commander are disseminated to appropriate maneuver and fire support agencies and stored for future reference.
- Explain/clarify commander's guidance. The FSCOORD translates the commander's guidance into fire support terms and ensures that the

expanded guidance is received and understood by the fire support unit commanders and their staffs.

- Obtain target information from the target generation and processing element. The fire support command element obtains recommended targets to attack and recommended fire units to execute the attack from the target generation and processing element.
- Plan required fires. High priority targets are identified, and fire units to execute the attack are determined within the constraints of the type of fires (preparatory, air defense suppression, etc.) that are needed.
- Perform fire support C^2 processing on submitted targets. To ensure coordination of fires from the various fire support agencies (field artillery, USAF, etc.), submitted targets are examined before being forwarded to the agencies for fire planning.
- Program the distribution of fires. The amount of ammunition to expend on particular target types is determined, and this information is distributed throughout the fire support element for use in fire planning.
- Forward targets to appropriate fire support agencies and intelligence/electronic warfare. When targets have been approved for attack, they are forwarded to the designated fire support agencies for inclusion in the agencies' particular fire support plans. Intelligence/electronic warfare also receives the target information.
- Obtain fire support plans from each fire support agency. Plans developed by each individual fire support agency are forwarded to the fire support command element for review and integration.

- Compile and coordinate the plans from fire support agencies. The commanding fire support element compiles and summarizes the plans from individual agencies to produce a composite fire support plan.
- Distribute the resulting fire support plan. The composite fire support plan is forwarded to the next higher echelon of fire support command and to maneuver, it is distributed to subordinate units for implementation, and it is also stored in the fire support files.
- Prepare fire support capability overlay. A display of the range capabilities of all fire support assets is maintained.

D.1.3 FIRE SUPPORT STATUS

Fire support status includes the following six subfunctions:

- Obtain information on status of allocated resources. The status of allocated resources is determined and sent from subordinate units to the commanding unit. Status information includes unit location, unit strength, personnel resources, equipment resources, unit/weapon readiness, unit mobility, engagement status, and results of enemy engagement.
- Compile status information from allocated resources. Information is summarized and condensed, and the information required by headquarters elements or other units is extracted.
- Maintain status information. Status information is continually updated, and the information is stored in fire support files.
- Update fire support situation map. The situation map is continually updated with the current tactical information.

- Update fire support status charts. Displays of status information are continually updated with the current information.
- Distribute status information. Summarized status information is distributed to the commanding headquarters and other appropriate centers.

D.1.4 ACQUISITION, EXPANSION, AND DISSEMINATION OF COMMANDER'S GUIDANCE

Acquisition, expansion, and dissemination of the commander's guidance include the following six subfunctions:

- Request commander's guidance as necessary. The FSCOORD determines if the situation requires additional guidance from the commander and is responsible for apprising the commander of the specifics of the situation and requesting guidance.
- Receive commander's guidance. The FSCOORD is responsible for obtaining and understanding the force commander's guidance. The guidance may concern target analysis, fire planning, fire support related combat service support, munitions management, and targetted areas of interest (including target boxes or other issues of planning and implementation).
- Record commander's guidance. The commander's guidance is recorded and maintained in fire support files.
- Translate the commander's guidance into fire support terms. The FSCOORD and his staff determine the implications of the force commander's guidance for the fire support element, and describe the guidance and its implications in fire support terms in order to ensure that the guidance is incorporated into fire support activities.

- Amplify the commander's guidance, as appropriate. Fire support commanders and their staffs utilize their understanding of the commander's guidance to provide additional detail and direction for subordinate units.
- Distribute and explain the commander's guidance. The commander's guidance, as expanded upon and translated into fire support terms, is communicated downward through the fire support chain of command.

D.1.5 DATA EXCHANGE WITH MANEUVER CONTROL SYSTEM

Fire support coordination requires a common understanding of the battle plans and situation at the fire support and maneuver headquarters. Consequently, a number of data elements are exchanged between fire support and maneuver. The subfunctions of data exchange with maneuver are the transmission and receipt of these data elements. These subfunctions, listed below, support, and to some extent overlap, with the other functions and subfunctions of fire support coordination:

- monitor task organization;
- monitor tactical missions;
- monitor current tactical situation;
- monitor battlefield geometry;
- monitor future operations or plans;
- transmit recommendations for commander's guidance;
- receive commander's guidance;
- transmit recommendations for use of fire support assets;
- transmit acquired ENSIT data.
- transmit fire support asset status;

- transmit fire support plans and/or orders;
- transmit fire support coordination measures; and
- receive nuclear release messages;

D.2 TARGET GENERATION AND PROCESSING

This functional category consists of all the activities for planning the collection and processing of target information, collecting and disseminating target information, and interpreting and evaluating target information. The O&O Plan organizes these activities into five operational functions:

- Target requirements -- establishment of requirements to direct the acquisition, maintenance, and processing of target information;
- Sensor control -- deployment, employment, and management of fire support sensors in accordance with target requirements;
- Target processing -- interpretation and evaluation of target information and development and distribution of target attack recommendations;
- Target attack assessment -- assessment of the results of target attacks and determination of requirements for additional fires; and
- Data exchange with intelligence/electronic warfare system -- exchange of intelligence data between fire support and intelligence/electronic warfare.

In the following five sections, the components of each of these functions are presented and described.

D.2.1 TARGET REQUIREMENTS

Target requirements include the following eight subfunctions:

- Incorporate commander's guidance into target requirements. The commander's guidance concerning TAIs, priority types of targets, etc., is incorporated into the target requirements.
- Incorporate intelligence/electronic warfare recommendations into target requirements. Recommendations from intelligence/electronic warfare concerning TAI and target value analysis are evaluated and incorporated into the target requirements.
- Perform target value analysis. This analysis determines the types of targets to attack for greatest tactical benefit.
- Determine TAI for target acquisition efforts. Given the commander's guidance and intelligence/electronic warfare recommendations, particular areas of the battlefield are identified as the high priority areas for target acquisition efforts.
- Establish target criteria. Target criteria are defined and implemented for rapid classification and prioritization of targets to achieve timely target engagement by appropriate elements of the fire support system.
- Establish target purging guidance. Guidance is specified and implemented for appropriately eliminating targets from the target information that accumulates over time.
- Disseminate target requirements. Target requirements, including priority types of targets, TAIs, target criteria, and purging guidance, are disseminated to fire support elements, including target acquisition and processing elements, and to intelligence/electronic warfare.

- Synchronize target generation and processing activities with intelligence/electronic warfare operations. Real-time communication between the fire support target generation and processing element and intelligence/electronic warfare is required to synchronize operations.

D.2.2 SENSOR CONTROL

Sensor control includes the following five subfunctions:

- Plan sensor deployment and operation. The distribution of sensors throughout the battlefield and the associated airspace and the operation of the sensors is planned in accordance with established target requirements.
- Implement sensor plans. Plans for sensor deployment and operation are disseminated to implementing elements.
- Cue sensors. During operation, sensors are cued to increase survivability. Knowledge of and reaction to enemy activities are required.
- Process combat data. Data from sensors are received and translated into usable form.
- Distribute combat data. After processing, combat data are stored and distributed to fire support units that use the data and to intelligence/electronic warfare.

D.2.3 TARGET PROCESSING

Target processing includes the following ten subfunctions:

- Obtain target information. Target location and target characteristics are obtained from forward observers, sensors, and intelligence/electronic warfare.

- Compile and integrate target information. Target information received from the various sources is integrated and compiled into a single unified information source.
- Maintain target information. Target information is continually updated and stored.
- Purge targets. Accumulated target information is purged of targets in accordance with established target requirements.
- Analyze/identify targets. Target information is analyzed to identify particular targets on the battlefield and to determine relevant attributes of those targets.
- Share information with intelligence/electronic warfare. Target information collected by fire support assets is forwarded to intelligence/electronic warfare, and target information obtained by intelligence/electronic warfare is sent to fire support when appropriate.
- Determine recommended targets for attack. Recommendations of targets to attack are developed in accordance with established target requirements.
- Determine recommended fire units to execute the attack. Recommendations of fire units to execute the attack are developed in accordance with established target requirements.
- Forward target and fire unit recommendations to command element. Recommendations are prepared and forwarded to the command element for cognizance and review.
- Call for fire. The call for fire is prepared and transmitted.

D.2.4 TARGET ATTACK ASSESSMENT

Target attack assessment includes the following seven subfunctions:

- Obtain fire mission information. Fire mission information, including the target, firing unit, and desired results, is received by the forward observer.
- Observe effects of fire. During the attack on the target, the forward observer observes and, as necessary, directs the fire.
- Report effects of fire. The forward observer reports the observations and directions to the unit controlling the fire mission.
- Measure effects of fire against desired results. The results of the attack are evaluated relative to the intended damage.
- Determine if additional fires needed. A decision for additional fires is made depending on the effects of fires, the resources allotted for the fire mission, and the priorities of other targets queued for the firing unit.
- Determine target location/firing adjustments. The forward observer locates the target and determines necessary firing adjustments for subsequent attacks.
- Call for fire. The forward observer prepares and transmits the call for additional fire.

D.2.5 DATA EXCHANGE WITH INTELLIGENCE/ELECTRONIC WARFARE SYSTEM

Both fire support and intelligence/electronic warfare perform target acquisition and develop enemy intelligence. The efficiency and effectiveness of both functional areas are enhanced by the timely exchange of data of mutual interest and importance. These data exchange subfunctions are listed below, and they support and to some extent overlap with

the other functions and subfunctions of target generation and processing.

- receive recommended TAI/NAI and other target requirement recommendations;
- receive target recommendations from I/EW system;
- transmit plans for sensor deployment;
- transmit target and combat information acquired by field artillery;
- transmit target criteria and other target requirements; and
- transmit target attack assessments.

D.3 FIELD ARTILLERY OPERATIONS

This category of functions coordinates and directs field artillery units within the specific directions received from the fire support command element and the supported maneuver command element. Five functions are listed in the O&O Plan:

- Field artillery status report -- management of information concerning the status of subordinate field artillery units;
- Field artillery ammunition -- management of information concerning the status of ammunition in the subordinate field artillery units;
- Field artillery support planning -- planning field artillery activities to accomplish synchronization of field artillery fires and ground combat operations, and performance of necessary supporting tasks such as field artillery survey;
- Field artillery command and control -- coordination of field artillery with the supported maneuver force and other fire support assets; and

- Generation and dissemination of attack criteria -- incorporation of force commander's guidance into field artillery attack criteria, and specification and distribution of attack criteria.

The subfunctions that have been identified for each of these functions are presented and discussed in the following five sections.

D.3.1 FIELD ARTILLERY STATUS REPORT

Field artillery status report includes the following four subfunctions:

- Obtain information on status of allocated resources. The status of allocated resources is determined and sent from subordinate units to superior units. Status information includes unit location, unit strength, personnel resources, equipment resources, unit/weapon readiness, unit mobility, engagement status, and results of enemy fires.
- Compile status information from allocated resources. Information is summarized and condensed, and information required by the parent unit or other headquarters is extracted.
- Maintain status information. Status information is continually updated and stored.
- Distribute status information. Summarized status information is distributed to the commanding headquarters and other appropriate units.

D.3.2 FIELD ARTILLERY AMMUNITION

Field artillery ammunition includes the following six subfunctions:

- Inventory ammunition. The current amounts and types of ammunition in various locations throughout the field artillery units are determined.
- Compile ammunition status information. Ammunition status information is summarized and condensed, and information required by the commanding headquarters, the combat service support elements, and other units is extracted.
- Maintain ammunition status information. Ammunition status information is continually updated and stored.
- Distribute ammunition status information. Summarized status information is distributed to the commanding headquarters, the combat service support elements, and other relevant units.
- Establish warning condition indicators. Ammunition supply warning condition indicators using the basic load, the locations of fire units, supplies at fire units, the locations of ammunition dumps, the resupply capability, the projected fire rates, and the planned unit movement are established and implemented.
- Monitor warning condition indicators. Ammunition status information is monitored to detect indications that resupply action is warranted.

D.3.3 FIELD ARTILLERY SUPPORT PLANNING

Field artillery support planning includes the following 18 subfunctions:

- Receive requests for immediate fires. Calls for fire are sent from the forward observer to the firing battery and monitored by the FIST.

- Select/approve requests for immediate fires. A prompt decision on calls for immediate fires is made at the element that has been delegated such authority.
- Designate field artillery unit for fire mission. Fire missions are assigned to particular units based on mission requirements, unit capabilities, and unit status.
- Plan fires to support the scheme of maneuver. Within the specific directives received from the maneuver and fire support command elements, artillery fire plans are developed and prepared for distribution.
- Disseminate fire plans. Artillery fire plans are forwarded to the commanding field artillery and fire support element and to maneuver; they are distributed to subordinate field artillery units for implementation, and they are stored for future reference.
- Plan ammunition allocation to field artillery units. Within the commander's guidance and in conjunction with combat service support, field artillery command determines the allocation of ammunition throughout the field artillery units.
- Select registration points. Registration points are chosen, and their locations are determined and reported.
- Plan survey field work. The field work required to collect necessary survey data is planned, and the plans are distributed to implementing units.
- Collect survey data through field work. Survey data is determined and reported.

- Compute additional survey data. Additional survey information is developed from the data collected during fieldwork used in conjunction with prior terrain information.
- Maintain survey data. Survey data are compiled into useful formats and entered into the field artillery files.
- Distribute survey data. The compiled data are distributed throughout the fire support segment and other segments of the field Army as appropriate.
- Collect meteorological data (MET). Artillery meteorological units support the Air Weather Service by collecting MET information.
- Disseminate MET data. Data collected by the artillery meteorological units are disseminated to firing units, as required, and to the Air Weather Service.
- Maintain MET data. MET data required for accurate fires are maintained for use in planning and in ballistic computation.
- Plan sensor deployment and operation. The distribution of sensors throughout the battlefield and the operation of the sensors are planned in accordance with established target requirements.
- Select observation posts. Observation posts are chosen, and their locations are determined and reported.
- Implement sensor plans. Plans for sensor deployment and operation are disseminated to implementing units.

D.3.4 FIELD ARTILLERY COMMAND CONTROL

Field artillery command control includes the following seven subfunctions:

- Obtain field artillery tactical missions. Tactical missions assigned to field artillery by the force commander are obtained by field artillery through the FSCOORD.
- Obtain force commander's guidance concerning field artillery. The artillery commanding officer obtains and amplifies the force commander's guidance regarding field artillery.
- Advise fire support and maneuver command elements on use of field artillery assets. The field artillery commander and his staff advise the fire support command element and the supported maneuver command element on the use of artillery for the delivery of fire and on the use of artillery target acquisition assets.
- Obtain targets for field artillery fire plan. Targets designated for attack by artillery are received at field artillery headquarters for inclusion in the field artillery fire plan.
- Monitor field artillery operations. The field artillery commanding officer and his staff monitor the execution of current field artillery operations and the outcome of completed operations conducted in order to control and coordinate operations and revise plans as necessary.
- Monitor field artillery capabilities. The field artillery commander and his staff must be informed on the capabilities of field artillery units to operate and to accomplish missions in order to develop meaningful plans and to support the maneuver planning and operations control.
- Synchronize field artillery operations with maneuver operations. Real-time communication between the field artillery and maneuver command elements is required to synchronize operations.

D.3.5 GENERATION AND DISSEMINATION OF ATTACK CRITERIA

Generation and dissemination of attack criteria include the following four subfunctions:

- Incorporate commander's guidance into attack criteria. The commander's guidance concerning the types of targets to attack, the time frame for target attack, and the effects expected after engagement is extracted and incorporated into the attack criteria.
- Determine attack criteria. The types of targets to be attacked, the time frame for target attack, and the effects expected after engagement are defined.
- Decide on methods to disseminate attack criteria. The methods to be used to communicate the attack criteria to all organizations that need it are decided.
- Disseminate attack criteria. Established target criteria are disseminated for implementation in target acquisition and fire planning.

D.4 TECHNICAL FIRE DIRECTION

This category refers to the activities involved in generating firing data for field artillery units upon receipt of a request for fire. The O&O Plan specifies two functions for technical fire direction:

- Report Generation - maintenance of data required for computation of firing data; and
- Computation -- production of firing data.

The subfunctions that were identified for each function are discussed in the following two sections.

D.4.1 REPORT GENERATION

Report generation includes the following four subfunctions:

- Obtain fire unit status information. Status information pertinent to technical fire direction is collected at the weapons and forwarded for compilation. Such information includes weapon location, weapon altitude, weapon readiness, ammunition status, and personnel status.
- Compile fire unit status information. Information from the weapons is summarized and condensed, and information required for technical fire direction is extracted.
- Maintain fire unit status information. The fire unit status information is continually updated, and the information is stored so that it is readily accessible for technical fire direction.
- Distribute fire unit status information. Information on the status of fire units is distributed as required for technical fire direction and for field artillery status reports.

D.4.2 COMPUTATION

Computation of firing data includes the following five subfunctions:

- Obtain target data. When a target is selected for attack, the technical fire direction center obtains target data needed for computation. This includes the nature of the target and its location.
- Access stored data on fire units. The technical fire direction center retrieves from storage the status information for the firing unit designated to attack the target.

- Test for violations of tactical geometry. Tests that require knowledge of exact projectile trajectory are performed (e.g., mask clearance and airspace coordination requirement). If violations of tactical geometry are discovered, then the unit assigning the fire mission is notified.
- Compute firing data. Firing data computed from the target data and the fire unit data.
- Transmit/implement firing data. The firing data transmitted to the weapons where it is implemented.

D.5 SUPPORT AND SUSTAINMENT

This category includes all functions performed within the fire support functional area to provide combat service support to field artillery units. These functions include maintaining the status of and determining the requirements for personnel, supplies, ammunition, equipment, and maintenance support. Also in this category is the function of providing security to field artillery units.

The O&O Plan delineates seven functions in the support and sustainment category:

- Personnel -- management of information on unit personnel and processing and assigning personnel as appropriate;
- Logistics -- planning and implementation of resupply and maintenance activities;
- Status reports -- management of supply (except ammunition) and equipment status information, and determination of resupply and maintenance requirements;

- Ammunition resupply -- maintenance of ammunition status information, determination of ammunition resupply requirements, and development and implementation of ammunition resupply plans;
- Reconstitution -- transformation of a degraded unit into a mission capable unit;
- Security -- allocation of field artillery resources to security activities and utilization of information collected by the security force to protect subordinate units; and
- Data exchange with combat service support system -- exchange of required data between field artillery and combat service support.

Support and sustainment subfunctions are presented in the following seven sections.

D.5.1 PERSONNEL

Personnel includes the following nine subfunctions:

- Determine status of unit personnel. Commanders are responsible for assessment of the capabilities of the personnel in the unit and the current ability of the personnel to perform in accordance with their capabilities. Records of personnel data such as grade, MOS, security clearance, etc., are maintained.
- Compile unit personnel status information. Personnel status information is summarized, and information required for fire planning, reconstitution, or other activities is extracted.
- Distribute unit personnel status information. Summarized personnel status information is distributed to the commanding unit and to other units as appropriate.

- Determine unit requirements for personnel. The status of personnel and the expected unit performance are considered to determine unit requirements for personnel.
- Assign and process personnel. Personnel are assigned to units based on unit requirements and reconstitution demands, and orders are prepared, distributed, and filed.
- Develop personnel inspection checklists. The information to be contained in the personnel inspection checklists is determined, and the checklists are prepared and maintained on file.
- Distribute personnel inspection checklists. The checklists are distributed for use in subordinate units.
- Prepare personnel evaluation reports. Subordinate personnel are evaluated, and the resulting information is compiled and summarized in evaluation reports.
- Maintain personnel records. All information concerning personnel is updated, as appropriate, and the information is stored in appropriate files.

D.5.2 LOGISTICS

Logistics includes the following eight subfunctions:

- Obtain resupply capability information. Information, such as number of available supply trucks and locations of supply points, is collected and kept on file for retrieval when planning resupply.
- Develop resupply plans. Based on resupply capabilities and requirements, plans for resupply of field artillery units are formulated.

- Implement resupply plans. Resupply plans are transmitted and explained to implementing units.
- Implement resupply plans. Disseminate plans and orders to initiate action.
- Plan maintenance/repair activities. Based on available resources and on requirements for equipment maintenance and repair, plans for these activities are developed.
- Implement maintenance/repair plans. Plans for maintenance or repair of equipment are communicated to implementing units.
- Plan equipment recovery. Equipment recovery is planned within the constraints of the tactical situation.
- Implement plans for equipment recovery. Plans for equipment recovery are communicated to implementing units.
- Synchronize field artillery support and sustainment activities with combat service support operations. Real-time communication between the field artillery and combat service support command elements is required to synchronize operations.

D.5.3 STATUS REPORTS

Status reports includes the following ten subfunctions:

- Inventory unit supplies. The current amounts of all classes of supplies (except class V, ammunition) distributed throughout the field artillery units are determined.
- Compile inventory information. Supply inventory information is summarized into a condensed form, and information required by combat service support units is extracted.
- Maintain inventory information. Supply inventory information is continually updated and stored in field artillery files.

- Distribute inventory information. Summarized inventory information is distributed to the combat service support units and other units, as appropriate.
- Establish warning condition indicators. Supply warning condition indicators are established and implemented.
- Monitor warning condition indicators. Supply inventory information is monitored to detect indications that resupply action is warranted.
- Determine supply requirements. Current supply inventory information and projected expenditure of supplies are considered to determine unit requirements for supplies.
- Request resupply. When resupply is needed, requests are prepared and transmitted to appropriate commanding and support elements.
- Determine maintenance/repair requirements. Equipment functioning is monitored for indications that maintenance or repair is required.
- Request maintenance/repair support. When maintenance or repair is needed, requests for such support are prepared and transmitted.

D.5.4 AMMUNITION RESUPPLY

Ammunition resupply includes the following four subfunctions:

- Obtain ammunition status information. Summarized ammunition status information is received by ammunition supply units.
- Obtain ammunition resupply capability information. Information, such as the number of available supply trucks and the location of ammunition supply points, is collected and filed for retrieval when planning ammunition resupply.

- Develop ammunition resupply plans. Based on ammunition resupply capabilities and requirements, plans for resupply of field artillery units are formulated.
- Implement ammunition resupply plans. Ammunition resupply plans are transmitted and explained to implementing units.

D.5.5 RECONSTITUTION

Reconstitution includes the following four subfunctions:

- Determine personnel and materiel requirements for upgrading a unit. The status of the degraded unit is evaluated in relation to the desired unit condition to determine requirements for personnel and materiel.
- Request required personnel and materiel. Requests are made to obtain required personnel and materiel from other field artillery assets or from the combat service support system.
- Infuse new personnel into unit. Orders are given to new personnel and discussed as necessary.
- Supervise unit functioning. The functioning of the upgraded unit is observed to assure that the desired results of reconstitution are achieved.

D.5.6 SECURITY

Security includes the following six subfunctions:

- Allocate resources for security activities. Adequate field artillery resources must be allocated to conduct the necessary security activities.

- Obtain information from security forces. Information is collected by scouting elements, liaison elements, etc., and the information is transmitted to a coordinating unit.
- Compile and integrate information from security forces. Information received from various security elements is integrated and compiled into a unified resource.
- Determine if breach of security occurs. The compiled information is analyzed to determine if a breach of security occurs.
- Alert appropriate agencies of breach of security. When a breach of security is suspected, appropriate agencies must be alerted to rectify the situation.
- Exchange information with other security forces. Information is shared with other security forces at unit boundaries and points of coordination.

D.5.7 DATA EXCHANGE WITH COMBAT SERVICE SUPPORT SYSTEM

Combat service support and field artillery interact extensively to support the operational units. Effective interaction requires a common understanding of the support needs and plans. This requires data exchange. These data exchange subfunctions support and to some extent overlap with the other functions and subfunctions of support and sustainment:

- transmit status data regarding supplies, ammunition, personnel, and equipment;
- transmit requests for resupply, ammunition resupply, personnel, equipment, and maintenance/repair support; and
- receive plans for combat service support activities.

APPENDIX E: ADP SERVICES FOR AFATDS OPERATIONAL FUNCTIONS

This appendix presents recommendations for the use of the ADP services described in appendix C to provide automated assistance to the AFATDS operational functions and subfunctions described in appendix D. The recommendations are presented as a list of technologically and operationally sound applications of ADP to fire support C^2. The recommendations identify the ADP services which can be of assistance in each of the subfunctions and identify the type or types of assistance provided. These recommendations are provided as inputs to the AFATDS development process, their intended use being to assist the combat developers in:

(1) selecting services to be provided and functions to be assisted by the AFATDS; and

(2) defining the system operation for the services and functions selected.

Since selection of services and functions is beyond the scope of this document, no attempt was made to restrict the list of applications other than on the basis of technological and operational soundness. When two services could independently provide similar types of assistance to a subfunction, both services were identified as possible choices for automated support. An example of such duplication occurs in the subfunction "obtain information on status of allocated resources." If the status information is stored in a database, the 'computing and manipulating data" service could be used to retrieve it. But if status reports are maintained in field files, the "filing" service would be used to access the reports. Both services are included in the recommendations for automated assistance to this subfunction.

In addition, no cost-benefit analysis was performed to aid the selection of services and functions. If and when a cost-benefit analysis is performed, then for each set of services and functions under consideration, the analysis should examine the following three factors:

(1) the importance or priority of the functions being assisted;

(2) the extent and type of the impact of the automated assistance on the performance of both the functions being assisted and on the functions not being assisted; and

(3) the hardware, software, and personnel requirements to implement the services in support of the selected functions.

The recommendations were developed by combining the information in the ADP services/generic C^2 tasks correlation matrix of exhibit C-3 with the information in the generic C^2 tasks/AFATDS functions correlation matrix contained in appendix B. Since many of the subfunctions are closely related, the recommendations contain some degree of redundancy regarding the use of the ADP services in actual operations. Consider, for example, the two subfunctions "compile ammunition status information" and "maintain ammunition status information." The "filing" service is recommended to assist both of these subfunctions by supporting retrieval and storage of ammunition status reports in personal files. In actual system operation, however, this would correspond to a single application of "filing" to simultaneously assist both subfunctions.

The recommendations are summarized in outline form in the remainder of this appendix. The structure of the outline corresponds to the organization of categories, functions, and subfunctions presented in appendix D. For each subfunction, recommendations are presented as brief

statements explaining how the seven ADP services can be used to assist in subfunction performance. When the subfunction would not benefit from a particular service, that service is designated as not applicable.

E.1 FIRE SUPPORT CONTROL AND COORDINATION

E.1.1 FIRE SUPPORT COORDINATION

E.1.1.1 Monitor Fire Support Operations

- Interfacing -- receive battlefield data from sensors, position/location reporting systems, etc., and exchange data with the Maneuver Control System;
- Monitoring -- detect prespecified conditions, such as arrival of a battery at a new location;
- Computing and Manipulating Data -- retrieve data, such as the current location of a particular fire unit, from the database;
- Preparing Reports -- compose messages and reports;
- Mailing -- request, receive, and forward messages and reports;
- Filing -- retrieve reports and plans; and
- Graphics Teleconferencing -- brief operations to superior fire support units and maneuver.

E.1.1.2 Monitor Fire Support Capabilities

- Interfacing -- exchange data with the Maneuver Control System;
- Monitoring -- detect prespecified conditions, such as immobilization of a fire unit;

- Computing and Manipulating Data -- retrieve fire unit information, such as the number of operable guns, from the database;
- Preparing Reports -- compose messages and reports;
- Mailing -- request, receive, and forward messages and reports;
- Filing -- retrieve reports and plans; and
- Graphics Teleconferencing -- brief capabilities to superior fire support units and maneuver.

E.1.1.3 Synchronize Fire Support Operations With Maneuver Operations

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose messages and create briefing slides and charts;
- Mailing -- exchange messages, reports, and plans with maneuver;
- Filing -- retrieve reports and plans from files; and
- Graphics Teleconferencing -- present and discuss operations.

E.1.2 FIRE SUPPORT PLANNING

E.1.2.1 Advise Maneuver Command Element on Use of Fire Support Assets

- Interfacing -- transmit data to the Maneuver Control System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose messages and create briefing slides and charts;
- Mailing -- exchange messages, reports, and plans with maneuver;

- Filing -- retrieve reports and plans from files; and
- Graphics Teleconferencing -- brief maneuver on use of fire support assets.

E.1.2.2 Program the Allocation of Fire Support Assets

- Interfacing -- exchange data with the Maneuver Control System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- execute algorithms for allocation of fires, retrieve information on fire support assets from the database, and key fire unit allocation data into the database for access by fire units;
- Preparing Reports -- compose messages and briefing slides and charts;
- Mailing -- receive and send allocation information;
- Filing -- retrieve plans, capability overlays, the commander's guidance, etc., and store allocation plans; and
- Graphics Teleconferencing -- present recommendations to maneuver and fire support agencies on allocation of assets.

E.1.2.3 Develop/Assign Fire Support Tactical Missions

- Interfacing -- exchange data with the Maneuver Control System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- execute algorithms for allocation and distribution of fires;
- Preparing Reports -- compose messages and transcribe fire support missions;
- Mailing -- notify units of mission assignments;

- Filing -- retrieve plans and reports and file fire support missions; and
- Graphics Teleconferencing -- discuss and develop tactical missions and brief assigned missions to fire support units.

E.1.2.4 Develop Coordination Measures

- Interfacing -- exchange data with the Maneuver Control System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- determine ranges of fires and areas of coverage and project movements and routes;
- Preparing Reports -- sketch coordination measures;
- Mailing -- send recommended coordination measures to maneuver and to subordinate units;
- Filing -- store and retrieve coordination measures; and
- Graphics Teleconferencing -- discuss coordination measures with maneuver and with subordinate units.

E.1.2.5 Disseminate Coordination Measures

- Interfacing -- transmit coordinates to the Maneuver Control System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- update database so to provide current coordination information to all database users;
- Preparing Reports -- transcribe coordination measures;
- Mailing -- disseminate coordination measures;
- Filing -- store and retrieve coordination measures; and
- Graphics Teleconferencing -- present coordination measures to fire support units.

E.1.2.6 Explain/Clarify Commander's Guidance

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- document expanded guidance;
- Mailing -- receive guidance from the commander and distribute expanded guidance to fire support units;
- Filing -- retrieve and store guidance documents; and
- Graphics Teleconferencing -- receive briefings from the commander and clarify and discuss guidance with fire support units.

E.1.2.7 Obtain Target Information From the Target Generation and Processing Element

- Interfacing -- not applicable;
- Monitoring -- alert personnel when prespecified target information such as the location of a command post is received;
- Computing and Manipulating Data -- update the target database;
- Preparing Reports -- prepare target messages and requests for targetting information;
- Mailing -- request information and receive messages and reports;
- Filing -- store reports; and
- Graphics Teleconferencing -- request and receive briefings on target information.

E.1.2.8 Plan Required Fires

- Interfacing -- exchange data with Maneuver and Intelligence/ Electronic Warfare Systems;

- Monitoring -- not applicable;
- Computing and Manipulating Data -- execute algorithms and retrieve capability data, target data, etc., from the database;
- Preparing Reports -- calculate measures such as range of fires, transcribe plans, and create briefing slides and charts;
- Mailing -- receive and send information;
- Filing -- retrieve plans and reports, and store plans; and
- Graphics Teleconferencing -- receive information, discuss and develop plans, and brief maneuver and subordinate units.

E.1.2.9 Perform Fire Support C^2 Processing on Submitted Targets

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- list candidate firing units, check for violations of battlefield geometry, and retrieve target and fire unit information from the database;
- Preparing Reports -- format and display target and fire unit information and prepare target assignments;
- Mailing -- receive targets and send target assignments;
- Filing -- retrieve and store target reports; and
- Graphics Teleconferencing -- display and discuss target and fire unit information.

E.1.2.10 Program the Distribution of Fires

- Interfacing -- exchange data with the Maneuver Control System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- execute algorithms for distribution of fires, retrieve target and capability information from

the database, and key fire distribution data into the database for use in fire planning;

- Preparing Reports -- perform arithmetic calculations and compose messages and briefing slides and charts;
- Mailing -- receive and send information;
- Filing -- retrieve plans, capability overlays, the commander's guidance, and store fire distribution plans; and
- Graphics Teleconferencing -- obtain commander's guidance and brief fire support units on the distribution of fires.

E.1.2.11 Forward Targets to Appropriate Fire Support Agencies and Intelligence/Electronic Warfare

- Interfacing -- exchange data with the Intelligence/Electronic Warfare System;
- Monitoring -- initiate data exchange with IEW, route target data;
- Computing and Manipulating Data -- key target assignment data into the database for access by fire support agencies;
- Preparing Reports -- prepare target assignments messages;
- Mailing -- send targets to fire support agencies;
- Filing -- file target assignments; and
- Graphics Teleconferencing -- brief fire support agencies on target assignments.

E.1.2.12 Obtain Fire Support Plans From Each Fire Support Agency

- Interfacing -- not applicable;
- Monitoring -- not applicable;

- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare plans and requests for plans;
- Mailing -- request and receive plans;
- Filing -- store plans; and
- Graphics Teleconferencing -- request and receive briefings on fire support plans.

E.1.2.13 Compile and Coordinate the Plans From Fire Support Agencies

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- reformat and combine plans;
- Mailing -- receive and send plans;
- Filing -- retrieve and store plans; and
- Graphics Teleconferencing -- discuss and coordinate plans.

E.1.2.14 Distribute the Resulting Fire Support Plan

- Interfacing -- transmit plans to the Maneuver Control System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare briefing slides and charts;
- Mailing -- send plans;
- Filing -- retrieve and store plans; and
- Graphics Teleconferencing -- brief maneuver and fire support agencies on plans.

E.1.2.15 Prepare Fire Support Capability Overlay

- Interfacing -- not applicable;
- Monitoring -- initiate automatic overlay preparation based on the receipt of new data;
- Computing and Manipulating Data -- automatically generate capability overlay and retrieve capability information from the database;
- Preparing Reports -- manually construct capability overlay;
- Mailing -- receive capability information and distribute capability overlay;
- Filing -- retrieve and store capability reports and overlays; and
- Graphics Teleconferencing -- request and receive capability information and display and discuss capability overlay.

E.1.3 FIRE SUPPORT STATUS

E.1.3.1 Obtain Information on Status of Allocated Resources

- Interfacing -- receive data from position/location reporting systems;
- Monitoring -- route position/location data messages;
- Computing and Manipulating Data -- retrieve information such as unit/weapon readiness from the database;
- Preparing Reports -- prepare requests for information and information messages;
- Mailing -- request and receive status information;
- Filing -- retrieve status reports; and
- Graphics Teleconferencing -- request and receive briefings.

E.1.3.2 Compile Status Information From Allocated Resources

- Interfacing -- transmit data to the Maneuver Control System;
- Monitoring -- initiate automatic compilation;
- Computing and Manipulating Data -- combine data from subordinate units, compute summary measures, such as total number of available guns, and retrieve status data from the database;
- Preparing Reports -- create required status reports;
- Mailing -- receive and send status reports;
- Filing -- retrieve and store status reports; and
- Graphics Teleconferencing -- obtain, present, and discuss status information.

E.1.3.3 Maintain Status Information

- Interfacing -- not applicable;
- Monitoring -- initiate automatic database updates;
- Computing and Manipulating Data -- update the database;
- Preparing Reports -- prepare and update status reports and data displays;
- Mailing -- receive status reports;
- Filing -- retrieve and store status reports and data displays; and
- Graphics Teleconferencing -- not applicable.

E.1.3.4 Update Fire Support Situation Map

- Interfacing -- not applicable;
- Monitoring -- initiate automatic map update;

- Computing and Manipulating Data -- generate updated map and retrieve situational information from the database;
- Preparing Reports -- create and revise situation maps;
- Mailing -- receive information and distribute updated map;
- Filing -- retrieve and store situation map; and
- Graphics Teleconferencing -- receive information and display and discuss situation map.

E.1.3.5 Update Fire Support Status Charts

- Interfacing -- not applicable;
- Monitoring -- initiate automatic chart update;
- Computing and Manipulating Data -- generate updated charts and retrieve status information from the database;
- Preparing Reports -- create and revise charts;
- Mailing -- receive information and distribute updated charts;
- Filing -- retrieve and store fire support charts; and
- Graphics Teleconferencing -- receive information and display and discuss fire support charts.

E.1.3.6 Distribute Status Information

- Interfacing -- transmit data to the Maneuver Control System;
- Monitoring -- initiate data and information distribution;
- Computing and Manipulating Data -- retrieve status information needed for messages and reports from the database;
- Preparing Reports -- prepare messages and status reports;
- Mailing -- send messages and status reports;
- Filing -- retrieve status reports; and
- Graphics Teleconferencing -- brief status information.

E.1.4 ACQUISITION, EXPANSION, AND DISSEMINATION OF COMMANDER'S GUIDANCE

E.1.4.1 Request Commander's Guidance As Necessary

- Interfacing -- not applicable;
- Monitoring -- detect prespecified data conditions indicating the need for the commander's guidance;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare requests for guidance;
- Mailing -- send requests to maneuver command element;
- Filing -- not applicable; and
- Graphics Teleconferencing -- request guidance.

E.1.4.2 Receive Commander's Guidance

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- not applicable;
- Mailing -- receive guidance;
- Filing -- not applicable; and
- Graphics Teleconferencing -- receive briefings from the commander.

E.1.4.3 Record Commander's Guidance

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- record commander's guidance;

- Mailing -- not applicable;
- Filing -- store recorded guidance; and
- Graphics Teleconferencing -- receive briefings from the commander.

E.1.4.4 Translate the Commander's Guidance Into Fire Support Terms

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- record expanded guidance;
- Mailing -- receive guidance from the commander and distribute expanded guidance to fire support units;
- Filing -- retrieve and store guidance documents; and
- Graphics Teleconferencing -- receive briefings from the commander and clarify and discuss guidance with fire support units.

E.1.4.5 Amplify the Commander's Guidance, As Appropriate

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose guidance documents;
- Mailing -- receive guidance from the commander and distribute expanded guidance to fire support units;
- Filing -- retrieve and store guidance documents; and
- Graphics Teleconferencing -- receive briefings from the commander and clarify and discuss guidance with fire support units.

E.1.4.6 Distribute and Explain the Commander's Guidance

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- specify appropriate data processing instructions, such as criteria for prioritizing targets;
- Preparing Reports -- compose guidance documents;
- Mailing -- send guidance documents;
- Filing -- retrieve guidance documents; and
- Graphics Teleconferencing -- brief guidance to fire support units.

E.1.5 DATA EXCHANGE WITH MANEUVER CONTROL SYSTEM

E.1.5.1 Monitor Task Organization

- Interfacing -- receive data;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- update task organization information in the database;
- Preparing Reports -- not applicable;
- Mailing -- receive plans;
- Filing -- store plans; and
- Graphics Teleconferencing -- briefings.

E.1.5.2 Monitor Tactical Missions

- Interfacing -- receive data;
- Monitoring -- not applicable;

- Computing and Manipulating Data -- update mission information in the database;
- Preparing Reports -- not applicable;
- Mailing -- receive missions;
- Filing -- file missions; and
- Graphics Teleconferencing -- briefings.

E.1.5.3 Monitor Current Tactical Situation

- Interfacing -- receive data;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- update tactical situation information in the database;
- Preparing Reports -- not applicable;
- Mailing -- receive reports;
- Filing -- store reports; and
- Graphics Teleconferencing -- briefings.

E.1.5.4 Monitor Battlefield Geometry

- Interfacing -- receive data;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- update battlefield geometry data in the database;
- Preparing Reports -- not applicable;
- Mailing -- receive reports on battle field geometry;
- Filing -- store reports; and
- Graphics Teleconferencing -- briefings.

E.1.5.5 Monitor Future Operations or Plans

- Interfacing -- receive data;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- update the database;
- Preparing Reports -- not applicable;
- Mailing -- receive plans;
- Filing -- store plans; and
- Graphics Teleconferencing -- briefings.

E.1.5.6 Transmit Recommendations for Commander's Guidance

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose recommendations and create briefing charts and slides;
- Mailing -- receive requests for recommendations and send recommendations;
- Filing -- store records; and
- Graphics Teleconferencing -- briefings obtaining requests for recommendations and presenting recommendations.

E.1.5.7 Monitor Commander's Guidance

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- not applicable;
- Mailing -- receive guidance documents, messages, and reports;

- Filing -- store guidance documents;
- Graphics Teleconferencing -- receive briefings from the commander.

E.1.5.8 Transmit Recommendations for Use of Fire Support Assets

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose recommendations and create briefing charts and slides;
- Mailing -- receive requests for recommendations and send recommendations.
- Filing -- store records; and
- Graphics Teleconferencing -- briefings obtaining requests for recommendations and presenting recommendations.

E.1.5.9 Transmit Acquired ENSIT Data

- Interfacing -- send data;
- Monitoring -- initiate data transmission based on prespecified criteria, such as detection of a particular type of target;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- manually prepare ENSIT reports;
- Mailing -- send ENSIT reports;
- Filing -- retrieve ENSIT reports; and
- Graphics Teleconferencing -- briefings.

E.1.5.10 Transmit Fire Support Asset Status

- Interfacing -- send status data;
- Monitoring -- initiate data transmission based on prespecified situations, such as unit displacement to a designated location;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- not applicable;
- Mailing -- send status reports;
- Filing -- retrieve status reports; and
- Graphics Teleconferencing -- briefings.

E.1.5.11 Transmit Fire Support Plans and/or Orders

- Interfacing -- send data;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare plans and orders;
- Mailing -- send plans and orders;
- Filing -- retrieve plans and orders; and
- Graphics Teleconferencing -- briefings.

E.1.5.12 Transmit Fire Support Coordination Measures

- Interfacing -- transmit coordinates;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- not applicable;
- Mailing -- send coordination measures;
- Filing -- retrieve coordination measure; and
- Graphics Teleconferencing -- briefings.

E.1.5.13 Monitor Nuclear Release Messages

- Interfacing -- receive messages;
- Monitoring -- alert personnel to nuclear release;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- not applicable;
- Mailing -- receive messages;
- Filing -- store; and
- Graphics Teleconferencing -- not applicable.

E.2 TARGET GENERATION AND PROCESSING

E.2.1 TARGET REQUIREMENTS

E.2.1.1 Incorporate Commander's Guidance into Target Requirements

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- record expanded guidance;
- Mailing -- receive guidance from the commander and distribute expanded guidance to fire support units;
- Filing -- retrieve guidance documents; and
- Graphics Teleconferencing -- receive briefings from the commander and brief guidance to fire support units.

E.2.1.2 Incorporate Intelligence/Electronic Warfare Recommendations into Target Requirements

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- record recommendations;
- Mailing -- request and receive recommendations from intelligence/electronic warfare;
- Filing -- retrieve recommendations from files; and
- Graphics Teleconferencing -- request and discuss recommendations.

E.2.1.3 Perform Target Value Analysis

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- optimization and evaluation algorithms;
- Preparing Reports -- record results of analysis;
- Mailing -- distribute results;
- Filing -- store results; and
- Graphics Teleconferencing -- briefings and discussions.

E.2.1.4 Determine Targetted Areas of Interest (TAI) for Target Acquisition Efforts

- Interfacing -- exchange TAI data with the Intelligence/Electronic Warfare System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- update and query database;
- Preparing Reports -- document TAI;

- Mailing -- distribute TAI;
- Filing -- store TAI; and
- Graphics Teleconferencing -- discuss TAI.

E.2.1.5 Establish Target Criteria

- Interfacing -- send data to the Intelligence/Electronic Warfare System;
- Monitoring -- specify target criteria for automatic message monitoring;
- Computing and Manipulating Data -- specify criteria to classifying and prioritize targets in database;
- Preparing Reports -- record target criteria;
- Mailing -- distribute criteria;
- Filing -- store criteria; and
- Graphics Teleconferencing -- not applicable.

E.2.1.6 Establish Target Purging Guidance

- Interfacing -- send data to the Intelligence/Electronic Warfare System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- specify target purging instructions for database processing;
- Preparing Reports -- prepare messages describing target purging guidance;
- Mailing -- distribute target purging guidance;
- Filing -- store target purging guidance; and
- Graphics Teleconferencing -- not applicable.

E.2.1.7 Disseminate Target Requirements

- Interfacing -- send data to the Intelligence/Electronic Warfare System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare messages describing target requirements;
- Mailing -- distribute target requirements;
- Filing -- store target requirements; and
- Graphics Teleconferencing -- present and explain target requirements.

E.2.1.8 Synchronize Target Generation and Processing Activities With Intelligence/Electronic Warfare Operations

- Interfacing -- exchange data;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- query and update database;
- Preparing Reports -- compose messages and create briefing slides and charts;
- Mailing -- exchange messages, plans, and reports;
- Filing -- retrieve plans and reports from files; and
- Graphics Teleconferencing -- present and discuss activities.

E.2.2 SENSOR CONTROL

E.2.2.1 Plan Sensor Deployment and Operation

- Interfacing -- exchange data with the Intelligence/Electronic Warfare System;

- Monitoring -- not applicable;
- Computing and Manipulating Data -- compute sensor coverage and retrieve battlefield data, ENSIT data, etc., from the database;
- Preparing Reports -- transcribe plans;
- Mailing -- receive information and distribute plans;
- Filing -- store and retrieve plans; and
- Graphics Teleconferencing -- brief, display, and discuss plans.

E.2.2.2 Implement Sensor Plans

- Interfacing -- not applicable;
- Monitoring -- specify situations for cueing sensors;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare plans and orders;
- Mailing -- distribute plans and orders;
- Filing -- retrieve plans and file orders; and
- Graphics Teleconferencing -- brief subordinate units.

E.2.2.3 Cue Sensors

- Interfacing -- trigger and receive data from sensors;
- Monitoring -- initiate or discontinue sensor operation based on tactical situation data, ENSIT data etc.;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare messages when manual cueing used;
- Mailing -- send instructions when manual cueing used;
- Filing -- not applicable; and
- Graphics Teleconferencing -- not applicable.

E.2.2.4 Process Combat Data

- Interfacing -- receive data from sensors;
- Monitoring -- alert personnel to particular data, such as identification of a certain type of target;
- Computing and Manipulating Data -- update the database and perform routine data processing tasks, such as deletion of duplicate data and integration of multiple messages concerning the same target;
- Preparing Reports -- not applicable;
- Mailing -- not applicable;
- Filing -- not applicable; and
- Graphics Teleconferencing -- not applicable.

E.2.2.5 Distribute Combat Data

- Interfacing -- send data to Intelligence/Electronic Warfare System;
- Monitoring -- route combat data based on type and source;
- Computing and Manipulating Data -- update database so to provide current combat data to all database users;
- Preparing Reports -- not applicable;
- Mailing -- not applicable;
- Filing -- not applicable; and
- Graphics Teleconferencing -- briefings.

E.2.3 TARGET PROCESSING

E.2.3.1 Obtain Target Information

- Interfacing -- receive data from sensors and from the Intelligence/Electronic Warfare System;
- Monitoring -- route target data and alert personnel to receipt of particular data, such as the location of a certain type of target;
- Computing and Manipulating Data -- retrieve target data from the database;
- Preparing Reports -- prepare requests for target information;
- Mailing -- request and receive target information;
- Filing -- retrieve target reports; and
- Graphics Teleconferencing -- request and discuss target information.

E.2.3.2 Compile and Integrate Target Information

- Interfacing -- transmit data to Intelligence/Electronic Warfare System;
- Monitoring -- initiate automatic compilation;
- Computing and Manipulating Data -- perform routine compilation tasks, such as associating pieces of information that pertain to the same target, and retrieve target information from the database;
- Preparing Reports -- compose reports regarding target information;
- Mailing -- receive and send target reports;

- Filing -- retrieve and store target reports; and
- Graphics Teleconferencing -- obtain, present, and discuss target information.

E.2.3.3 Maintain Target Information

- Interfacing -- not applicable;
- Monitoring -- initiate automatic database updates;
- Computing and Manipulating Data -- update the database;
- Preparing Reports -- prepare and update target reports and data displays;
- Mailing -- receive target reports;
- Filing -- retrieve and store target reports and data displays; and
- Graphics Teleconferencing -- not applicable.

E.2.3.4 Purge Targets

- Interfacing -- not applicable;
- Monitoring -- initiate target purging and alert personnel;
- Computing and Manipulating Data -- purge targets based on prespecified instructions;
- Preparing Reports -- compose messages;
- Mailing -- request and report target purging;
- Filing -- not applicable; and
- Graphics Teleconferencing -- not applicable.

E.2.3.5 Analyze/Identify Targets

- Interfacing -- exchange data with Intelligence/Electronic Warfare System;
- Monitoring -- detect target criteria and alert personnel;
- Computing and Manipulating Data -- classify and prioritize targets based on prespecified target criteria and retrieve target information from the database;
- Preparing Reports -- generate target reports;
- Mailing -- send and receive target reports;
- Filing -- retrieve target reports; and
- Graphics Teleconferencing -- display and discuss target information.

E.2.3.6 Share Information with Intelligence/Electronic Warfare

- Interfacing -- exchange data with the Intelligence/Electronic Warfare System;
- Monitoring -- route intelligence data and information based on type and source;
- Computing and Manipulating Data -- retrieve intelligence information from the database;
- Preparing Reports -- compose messages, reports, and plans;
- Mailing -- send and receive intelligence information;
- Filing -- retrieve and store reports and plans; and
- Graphics Teleconferencing -- obtain, present, and discuss intelligence information.

E.2.3.7 Determine Recommended Targets for Attack

- Interfacing -- exchange data with Intelligence/Electronic Warfare System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare recommendations;
- Mailing -- receive information and send recommendations;
- Filing -- retrieve reports and guidance documents; and
- Graphics Teleconferencing -- present and discuss target recommendations.

E.2.3.8 Determine Recommended Fire Units to Execute the Attack

- Interfacing -- exchange data with the Intelligence/Electronic Warfare System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve fire unit information from database;
- Preparing Reports -- prepare recommendations;
- Mailing -- receive information and send recommendations;
- Filing -- retrieve reports and guidance documents; and
- Graphics Teleconferencing -- discuss attack plans and present recommendations.

E.2.3.9 Forward Target and Fire Unit Recommendations to Command Element

- Interfacing -- transmit data to the Maneuver Control System;
- Monitoring -- not applicable;

- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare recommendations and create briefing slides and charts;
- Mailing -- send recommendations;
- Filing -- store and retrieve recommendations; and
- Graphics Teleconferencing -- brief command element.

E.2.3.10 Call for Fire

- Interfacing -- receive target location data from sensors;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve target and firing data from the database as relevant for ballistic computations;
- Preparing Reports -- compose call for fire messages;
- Mailing -- send messages;
- Filing -- store messages; and
- Graphics Teleconferencing -- not applicable.

E.2.4 TARGET ATTACK ASSESSMENT

E.2.4.1 Obtain Fire Mission Information

- Interfacing -- receive data from Maneuver Control System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve mission information from the database;
- Preparing Reports -- compose fire mission messages;
- Mailing -- receive and send messages;
- Filing -- store messages; and
- Graphics Teleconferencing -- receive briefings.

E.2.4.2 Observe Effects of Fire

- Interfacing -- receive sensor data;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose messages to report effects of fire;
- Mailing -- send and receive messages;
- Filing -- not applicable; and
- Graphics Teleconferencing -- not applicable.

E.2.4.3 Report Effects of Fire

- Interfacing -- transmit data to Maneuver Control System and Intelligence/Electronic Warfare System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- key the effects of the fire into the database;
- Preparing Reports -- compose messages reporting the effects of fire;
- Mailing -- send and receive messages;
- Filing -- store messages; and
- Graphics Teleconferencing -- not applicable.

E.2.4.4 Measures Effects of Fires Against Desired Results

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
-

- Preparing Reports -- compose messages concerning the effects of fire;
- Mailing -- receive and send messages;
- Filing -- not applicable; and
- Graphics Teleconferencing -- not applicable.

E.2.4.5 Determine If Additional Fires Needed

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose messages;
- Mailing -- receive and send messages;
- Filing -- not applicable; and
- Graphics Teleconferencing -- not applicable.

E.2.4.6 Determine Target Location/Firing Adjustments

- Interfacing -- receive target location data from sensors;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- ballistic computations and retrieve target location data from the database;
- Preparing Reports -- calculate required firing adjustments (if necessary) and compose messages regarding target location and firing adjustments;
- Mailing -- send messages;
- Filing -- not applicable; and
- Graphics Teleconferencing -- not applicable.

E.2.4.7 Call for Fire

- Interfacing -- receive target location data from sensors;
- Monitorin -- not applicable;
- Computing and Manipulating Data -- retrieve target and firing data from the database as relevant to ballistic computations;
- Preparing Reports -- compose call for fire messages;
- Mailing -- send messages;
- Filing -- store messages; and
- Graphics Teleconferencing -- not applicable.

E.2.5 DATA EXCHANGE WITH INTELLIGENCE/ELECTRONIC WARFARE SYSTEM

E.2.5.1 Receive Recommended TAI/NAI and Other Target Requirement Recommendations

- Interfacing -- exchange data (i.e., communication);
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- not applicable;
- Mailing -- receive recommendations;
- Filing -- not applicable; and
- Graphics Teleconferencing -- obtain and discuss recommendations.

E.2.5.2 Receive Target Recommendations from IEW System

- Interfacing -- receive data from the Intelligence/Electronic Warfare System;
- Monitoring -- alert personnel to receipt of particular data, such as identification of a certain type of target;

- Computing and Manipulating Data -- update the target database;
- Preparing Reports -- not applicable;
- Mailing -- receive target reports;
- Filing -- store target reports; and
- Graphics Teleconferencing -- not applicable.

E.2.5.3 Transmit Plans for Sensor Deployment

- Interfacing -- send data;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose messages describing plans;
- Mailing -- send plans;
- Filing -- retrieve plans; and
- Graphics Teleconferencing -- brief plans.

E.2.5.4 Transmit Target and Combat Information Acquired by Field Artillery

- Interfacing -- send data;
- Monitoring -- route target and combat data based on type and source;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose reports;
- Mailing -- send intelligence reports;
- Filing -- retrieve intelligence reports; and
- Graphics Teleconferencing -- not applicable.

E.2.5.5 Transmit Target Criteria and Other Target Requirements

- Interfacing -- send data;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose messages;
- Mailing -- send target requirements;
- Filing -- retrieve target requirements from files; and
- Graphics Teleconferencing -- not applicable.

E.2.5.6 Transmit Target Attack Assessments

- Interfacing -- transmit data;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose messages;
- Mailing -- send messages reporting effects of fire;
- Filing -- not applicable; and
- Graphics Teleconferencing -- not applicable.

E.3 FIELD ARTILLERY OPERATIONS

E.3.1 FIELD ARTILLERY STATUS REPORT

E.3.1.1 Obtain Information on Status of Allocated Resources

- Interfacing -- receive battery location data from position/ location reporting systems;
- Monitoring -- not applicable;

- Computing and Manipulating Data -- retrieve information, such as unit/weapon readiness, from the database;
- Preparing Reports -- prepare requests for information and reports;
- Mailing -- send requests and receive status information;
- Filing -- store and retrieve status reports; and
- Graphics Teleconferencing -- request and receive briefings.

E.3.1.2 Compile Status Information from Allocated Resources

- Interfacing -- not applicable;
- Monitoring -- initiate automatic compilation;
- Computing and Manipulating Data -- combine data from subordinate units, compute summary measures, such as total number of available guns, and retrieve status data from the database;
- Preparing Reports -- create required status reports;
- Mailing -- receive and send status reports;
- Filing -- retrieve and store status reports; and
- Graphics Teleconferencing -- obtain, present, and discuss status information.

E.3.1.3 Maintain Status Information

- Interfacing -- not applicable;
- Monitoring -- initiate automatic database updates;
- Computing and Manipulating Data -- update the database;
- Preparing Reports -- prepare and update status reports and data displays;
- Mailing -- receive status reports;

- Filing -- retrieve and store status reports and data displays; and
- Graphics Teleconferencing -- not applicable.

E.3.1.4 Distribute Status Information

- Interfacing -- transmit data to the Maneuver Control System;
- Monitoring -- initiate data and information distribution;
- Computing and Manipulating Data -- retrieve status information needed for messages and reports from the database;
- Preparing Reports -- prepare messages and status reports;
- Mailing -- send messages and status reports;
- Filing -- retrieve status reports; and
- Graphics Teleconferencing -- present and discuss status information.

E.3.2 FIELD ARTILLERY AMMUNITION

E.3.2.1 Inventory Ammunition

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare ammunition status reports;
- Mailing -- request ammunition inventory and send ammunition status reports;
- Filing -- not applicable; and
- Graphics Teleconferencing -- not applicable.

E.3.2.2 Compile Ammunition Status Information

- Interfacing -- transmit data to Combat Service Support System;
- Monitoring -- initiate automatic compilation;
- Computing and Manipulating Data -- combine ammunition data from subordinate units, compute summary measures, such as totaling the number of rounds of ammunition available throughout the subordinate units, and retrieve ammunition status data from the database;
- Preparing Reports -- create required ammunition status reports;
- Mailing -- receive and send ammunition status reports;
- Filing -- retrieve and store ammunition status reports; and
- Graphics Teleconferencing -- obtain, present, and discuss ammunition status information.

E.3.2.3 Maintain Ammunition Status Information

- Interfacing -- not applicable;
- Monitoring -- initiate automatic database updates;
- Computing and Manipulating Data -- update the database;
- Preparing Reports -- prepare and update ammunition status reports and data displays;
- Mailing -- receive ammunition status reports;
- Filing -- retrieve and store ammunition status reports and data displays; and
- Graphics Teleconferencing -- not applicable.

E.3.2.4 Distribute Ammunition Status Information

- Interfacing -- transmit data to the Combat Service Support System;
- Monitoring -- initiate data and information distribution;
- Computing and Manipulating Data -- retrieve ammunition information needed for messages and reports from the database;
- Preparing Reports -- prepare messages and ammunition status reports;
- Mailing -- send messages and ammunition status reports;
- Filing -- retrieve ammunition status reports; and
- Graphics Teleconferencing -- present and discuss ammunition status information.

E.3.2.5 Establish Warning Condition Indicators

- Interfacing -- not applicable;
- Monitoring -- use monitoring query language to specify indicators for automatic monitoring;
- Computing and Manipulating Data -- specify automated computations, such as the difference between available ammunition and the basic load;
- Preparing Reports -- document procedures for manually monitored indicators;
- Mailing -- distribute procedures for manually monitored indicators;
- Filing -- store procedures for manually monitored indicators; and
- Graphics Teleconferencing -- not applicable.

E.3.2.6 Monitor Warning Condition Indicators

- Interfacing -- not applicable;
- Monitoring -- detect warning conditions and alert personnel;
- Computing and Manipulating Data -- perform computations and retrieve from the database ammunition status data used in warning condition indicators;
- Preparing Reports -- perform calculations for manually evaluated warning condition indicators;
- Mailing -- receive ammunition status reports and alert personnel when warning conditions are indicated;
- Filing -- retrieve ammunition status reports and data displays and retrieve procedures for manually monitored indicators; and
- Graphics Teleconferencing -- obtain ammunition status information and alert personnel when warning conditions are indicated.

E.3.3 FIELD ARTILLERY SUPPORT PLANNING

E.3.3.1 Receive Requests for Immediate Fires

- Interfacing -- receive request data from Maneuver Control System;
- Monitoring -- route requests based on type and content;
- Computing and Manipulating Data -- update database (if appropriate);
- Preparing Reports -- not applicable;
- Mailing -- receive requests;
- Filing -- store requests; and
- Graphics Teleconferencing -- not applicable.

E.3.3.2 Select/Approve Requests for Immediate Fires

- Interfacing -- exchange data with Maneuver Control System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose messages;
- Mailing -- receive requests and send messages;
- Filing -- store approvals; and
- Graphics Teleconferencing -- not applicable.

E.3.3.3 Designate Field Artillery Unit for the Fire Mission

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve information on field artillery units from the database;
- Preparing Reports -- compose messages designating units;
- Mailing -- send messages to units;
- Filing -- retrieve status and capability reports; and
- Graphics Teleconferencing -- not applicable.

E.3.3.4 Plan Fires to Support Scheme of Maneuver

- Interfacing -- exchange data with Maneuver and Intelligence/ Electronic Warfare Systems;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- execute coverage, resupply, and other algorithms, and retrieve capability data, target data, etc., from the database;
- Preparing Reports -- perform planning calculations, transcribe plans, and create briefing slides and charts;

- Mailing -- receive and send information;
- Filing -- retrieve plans and reports, and store plans; and
- Graphics Teleconferencing -- receive information, discuss and develop plans, and brief maneuver and subordinate units.

E.3.3.5 Disseminate Fire Plans

- Interfacing -- transmit plans to the Maneuver Control System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare briefing slides and charts;
- Mailing -- send plans;
- Filing -- retrieve and store plans; and
- Graphics Teleconferencing -- brief maneuver and fire units on plans.

E.3.3.6 Plan Ammunition Allocation to Field Artillery Units

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- execute algorithms to project ammunition expenditure and retrieve ammunition status and unit status information from the database;
- Preparing Reports -- perform calculations, create data displays, and transcribe plans;
- Mailing -- receive information and send data displays and plans;
- Filing -- retrieve reports and guidance documents and store data displays and plans; and
- Graphics Teleconferencing -- obtain commander's guidance and brief ammunition allocations to field artillery units.

E.3.3.7 Select Registration Points

- Interfacing -- obtain data from maneuver and IEW systems;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- key registration points into the database; perform coverage and routing algorithms;
- Preparing Reports -- record locations of registration points;
- Mailing -- distribute locations of registration points;
- Filing -- store the locations of registration points; and
- Graphics Teleconferencing -- not applicable.

E.3.3.8 Plan Survey Fieldwork

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve survey data and information regarding survey units from the database;
- Preparing Reports -- transcribe plans;
- Mailing -- disseminate plans;
- Filing -- store and retrieve plans; and
- Graphics Teleconferencing -- not applicable.

E.3.3.9 Collect Survey Data Through Fieldwork

- Interfacing -- receive location reports from survey teams via position/location reporting systems;
- Monitoring -- initiate automatic database updates;
- Computing and Manipulating Data -- update the database;
- Preparing Reports -- prepare survey reports and data displays;
- Mailing -- receive survey reports;

- Filing -- store and retrieve survey reports and data displays; and
- Graphics Teleconferencing -- not applicable.

E.3.3.10 Compute Additional Survey Data

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- perform calculations on collected data and retrieve survey data from the database;
- Preparing Reports -- perform manual calculations and prepare survey reports and data displays;
- Mailing -- receive survey reports;
- Filing -- retrieve survey reports and data displays; and
- Graphics Teleconferencing -- not applicable.

E.3.3.11 Maintain Survey Data

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- update the database;
- Preparing Reports -- prepare and update survey reports and data displays;
- Mailing -- receive survey reports;
- Filing -- retrieve and store reports and data displays; and
- Graphics Teleconferencing -- not applicable.

E.3.3.12 Distribute Survey Data

- Interfacing -- transmit data to other systems;
- Monitoring -- initiate data and information distribution;
- Computing and Manipulating Data -- retrieve survey data from the database;
- Preparing Reports -- prepare survey reports and data displays;
- Mailing -- send survey reports and data displays;
- Filing -- retrieve survey reports and data displays; and
- Graphics Teleconferencing -- not applicable.

E.3.3.13 Collect Meteorological Data (MET)

- Interfacing -- receive data from IEW;
- Monitoring -- initiate automatic database updates;
- Computing and Manipulating Data -- update the database;
- Preparing Reports -- prepare MET reports;
- Mailing -- receive MET reports;
- Filing -- store and retrieve MET reports; and
- Graphics Teleconferencing -- not applicable.

E.3.3.14 Disseminate MET Data

- Interfacing -- transmit data to other systems;
- Monitoring -- initiate data and information dissemination;
- Computing and Manipulating Data -- retrieve MET data from the database;
- Preparing Reports -- prepare MET reports;
- Mailing -- send MET reports;
- Filing -- retrieve MET reports; and
- Graphics Teleconferencing -- not applicable.

E.3.3.15 Maintain MET Data

- Interfacing -- not applicable;
- Monitoring -- initiate automatic database updates;
- Computing and Manipulating Data -- update the database;
- Preparing Reports -- prepare and update MET reports;
- Mailing -- receive MET reports;
- Filing -- retrieve and store MET reports; and
- Graphics Teleconferencing -- not applicable.

E.3.3.16 Plan Sensor Deployment and Operation

- Interfacing -- exchange IPB data with the Intelligence/Electronic Warfare System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- compute sensor coverage and retrieve battlefield data, ENSIT data, etc., from the database;
- Preparing Reports -- transcribe plans;
- Mailing -- receive information and distribute plans;
- Filing -- store and retrieve plans; and
- Graphics Teleconferencing -- display and discuss plans.

E.3.3.17 Select Observation Posts

- Interfacing -- receive IPB data from IEW;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- key locations of observation posts into the database; execute route and coverage algorithms;
- Preparing Reports -- record the locations of observation posts;

- Mailing -- send the locations of observation posts;
- Filing -- retrieve battle plans and store the locations of observation posts; and
- Graphics Teleconferencing -- discuss observation post locations.

E.3.3.18 Implement Sensor Plans

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare plans and orders;
- Mailing -- distribute plans and orders;
- Filing -- retrieve plans and file orders; and
- Graphics Teleconferencing -- brief subordinate units.

E.3.4 FIELD ARTILLERY COMMAND CONTROL

E.3.4.1 Obtain Field Artillery Tactical Missions

- Interfacing -- receive data from the Maneuver Control System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- update mission information in the database;
- Preparing Reports -- compose messages;
- Mailing -- receive and acknowledge missions;
- Filing -- retrieve and store missions; and
- Graphics Teleconferencing -- receive briefings.

E.3.4.2 Obtain Force Commander's Guidance Concerning Field Artillery

- Interfacing -- not applicable;
- Monitoring -- detect situations requiring commander's guidance;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare requests;
- Mailing -- request and receive guidance;
- Filing -- retrieve guidance documents; and
- Graphics Teleconferencing -- receive briefings from and have discussions with the commander.

E.3.4.3 Advise Fire Support and Maneuver Command Elements on Use of Field Artillery Assets

- Interfacing -- transmit data to the Maneuver Control System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose messages and create briefing slides and charts;
- Mailing -- exchange messages, reports, and plans;
- Filing -- retrieve reports and plans from files; and
- Graphics Teleconferencing -- brief maneuver and fire support command elements.

E.3.4.4 Obtain Targets for Field Artillery Fire Plan

- Interfacing -- receive data;
- Monitoring -- initiate automatic database update and alert personnel to the update;
- Computing and Manipulating Data -- update the database;

- Preparing Reports -- not applicable;
- Mailing -- receive targets;
- Filing -- retrieve and store target information; and
- Graphics Teleconferencing -- obtain and discuss targets.

E.3.4.5 Monitor Field Artillery Operations

- Interfacing -- receive battlefield data from sensors and position/location reporting systems and exchange data with the Maneuver Control System;
- Monitoring -- detect prespecified situations, such as the position of a friendly unit in a free-fire zone;
- Computing and Manipulating Data -- retrieve data, such as the current location of a particular fire unit, from the database;
- Preparing Reports -- compose messages and reports;
- Mailing -- request, receive, and forward messages and reports;
- Filing -- retrieve reports and plans; and
- Graphics Teleconferencing -- discuss operations with field artillery units and inform maneuver.

E.3.4.6 Monitor Field Artillery Capabilities

- Interfacing -- exchange data with the Maneuver Control System;
- Monitoring -- detect prespecified conditions, such as immobilization of a fire unit;
- Computing and Manipulating Data -- retrieve fire unit information, such as the number of operable guns, from the database;
- Preparing Reports -- compose messages and reports;

- Mailing -- request, receive, and forward messages and reports;
- Filing -- retrieve reports and plans; and
- Graphics Teleconferencing -- discuss capabilities with field artillery units and inform maneuver.

E.3.4.7 Synchronize Field Artillery Operations with Maneuver Operations

- Interfacing -- exchange data with maneuver;
- Monitoring -- check for prespecified conditions such as the arrival of a unit at its destination;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose messages and create briefing slides and charts;
- Mailing -- exchange messages, reports, and plans with maneuver;
- Filing -- retrieve reports and plans from files; and
- Graphics Teleconferencing -- present and discuss operations.

E.3.5 GENERATION AND DISSEMINATION OF ATTACK CRITERIA

E.3.5.1 Incorporate Commander's Guidance into Attack Criteria

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- record expanded guidance;
- Mailing -- receive guidance from the commander and distribute expanded guidance;

- Filing -- retrieve guidance documents; and
- Graphics Teleconferencing -- receive briefings from the commander and clarify and discuss guidance with fire support units.

E.3.5.2 Determine Attack Criteria

- Interfacing -- exchange data with maneuver and IEW;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- record attack criteria;
- Mailing -- distribute attack criteria;
- Filing -- store attack criteria; and
- Graphics Teleconferencing -- discuss attack criteria relative to routes, terrain, ammunition supplies, and other information appropriate to graphic display.

E.3.5.3 Decide on Methods to Disseminate Attack Criteria

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose messages;
- Mailing -- send and receive messages concerning dissemination of attack criteria;
- Filing -- not applicable; and
- Graphics Teleconferencing -- not applicable.

E.3.5.4 Disseminate Attack Criteria

- Interfacing -- send data to Intelligence/Electronic Warfare System;
- Monitoring -- specify criteria, such as priority targets, for monitoring;
- Computing and Manipulating Data -- specify instructions for processing target data;
- Preparing Reports -- record attack criteria and prepare briefing slides and charts;
- Mailing -- distribute attack criteria;
- Filing -- store attack criteria; and
- Graphics Teleconferencing -- brief subordinate units.

E.4 TECHNICAL FIRE DIRECTION

E.4.1 REPORT GENERATION

E.4.1.1 Obtain Fire Unit Status Information

- Interfacing -- receive position/location data;
- Monitoring -- initiate automatic database update;
- Computing and Manipulating Data -- update the database;
- Preparing Reports -- not applicable;
- Mailing -- receive status reports;
- Filing -- retrieve status reports; and
- Graphics Teleconferencing -- not applicable.

E.4.1.2 Compile Fire Unit Status Information

- Interfacing -- not applicable;
- Monitoring -- initiate automatic compilation;
- Computing and Manipulating Data -- automatically update the database and summarize the data and key information from status reports into the database;
- Preparing Reports -- prepare summaries;
- Mailing -- receive status reports;
- Filing -- retrieve status reports; and
- Graphics Teleconferencing -- not applicable.

E.4.1.3 Maintain Fire Unit Status Information

- Interfacing -- not applicable;
- Monitoring -- initiate automatic database updates;
- Computing and Manipulating Data -- update the database;
- Preparing Reports -- not applicable;
- Mailing -- receive status reports;
- Filing -- file status reports; and
- Graphics Teleconferencing -- not applicable.

E.4.1.4 Distribute Fire Unit Status Information

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve status information from the database;
- Preparing Reports -- compose status reports;
- Mailing -- send status reports;

- Filing -- retrieve reports; and
- Graphics Teleconferencing -- briefings.

E.4.2 COMPUTATION

E.4.2.1 Obtain Target Data

- Interfacing -- receive data from sensors and IEW;
- Monitoring -- initiate automatic database update;
- Computing and Manipulating Data -- query and update target data in the database;
- Preparing Reports -- not applicable;
- Mailing -- receive target reports;
- Filing -- retrieve target reports; and
- Graphics Teleconferencing -- not applicable.

E.4.2.2 Access Stored Data on Fire Units

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- access fire unit data in the database;
- Preparing Reports -- not applicable;
- Mailing -- not applicable;
- Filing -- retrieve filed status reports; and
- Graphics Teleconferencing -- not applicable.

E.4.2.3 Test for Violations of Tactical Geometry

- Interfacing -- receive position location reports;

- Monitoring -- initiate automatic computation and testing and alert personnel if violations detected;
- Computing and Manipulating Data -- perform computations and retrieve and compare fire unit, target, and coordination data;
- Preparing Reports -- not applicable;
- Mailing -- view data;
- Filing -- not applicable; and
- Graphics Teleconferencing -- not applicable.

E.4.2.4 Compute Firing Data

- Interfacing -- not applicable;
- Monitoring -- initiate computations;
- Computing and Manipulating Data -- compute firing data;
- Preparing Reports -- use calculator functions to perform computations (as backup);
- Mailing -- not applicable;
- Filing -- not applicable; and
- Graphics Teleconferencing -- not applicable.

E.4.2.5 Transmit/Implement Firing Data

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare data messages;
- Mailing -- send data to weapons;
- Filing -- not applicable; and
- Graphics Teleconferencing -- not applicable.

E.5 SUPPORT AND SUSTAINMENT

E.5.1 PERSONNEL

E.5.1.1 Determine Status of Unit Personnel

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve personnel status information from the database;
- Preparing Reports -- prepare requests for personnel information and reports;
- Mailing -- request and receive personnel reports;
- Filing -- store and retrieve personnel reports; and
- Graphics Teleconferencing -- not applicable.

E.5.1.2 Compile Unit Personnel Status Information

- Interfacing -- transmit data to Combat Service Support System;
- Monitoring -- initiate automatic compilation;
- Computing and Manipulating Data -- combine data from subordinate units, compute summary measures, such as total number of personnel, and retrieve status data from the database;
- Preparing Reports -- create required personnel reports;
- Mailing -- receive and send personnel reports;
- Filing -- retrieve and store personnel reports; and
- Graphics Teleconferencing -- obtain, present, and discuss tabular and graphic personnel status information.

E.5.1.3 Distribute Unit Personnel Status Information

- Interfacing -- transmit data to Combat Service Support System;
- Monitoring -- initiate data and information distribution;
- Computing and Manipulating Data -- retrieve personnel information needed for messages and reports from the database;
- Preparing Reports -- prepare messages and personnel reports;
- Mailing -- send messages and personnel reports;
- Filing -- retrieve personnel reports; and
- Graphics Teleconferencing -- present and discuss tabular and graphic personnel status information.

E.5.1.4 Determine Unit Requirements for Personnel

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve personnel information from the database;
- Preparing Reports -- not applicable;
- Mailing -- not applicable;
- Filing -- retrieve personnel reports; and
- Graphics Teleconferencing -- not applicable.

E.5.1.5 Assign and Process Personnel

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- enter personnel assignments into the system;
- Preparing Reports -- prepare orders and records;

- Mailing -- send and receive orders and records;
- Filing -- file orders and records; and
- Graphics Teleconferencing -- not applicable.

E.5.1.6 Develop Personnel Inspection Checklists

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- transcribe checklists;
- Mailing -- distribute checklists;
- Filing -- store checklists; and
- Graphics Teleconferencing -- not applicable.

E.5.1.7 Distribute Personnel Inspection Checklists

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- not applicable;
- Mailing -- distribute checklists;
- Filing -- retrieve and store checklists; and
- Graphics Teleconferencing -- not applicable.

E.5.1.8 Prepare Personnel Evaluation Reports

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve personnel information from the database;

- Preparing Reports -- compose evaluation reports;
- Mailing -- send evaluation reports;
- Filing -- retrieve and store evaluation reports; and
- Graphics Teleconferencing -- not applicable.

E.5.1.9 Maintain Personnel Records

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- update personnel information in the database;
- Preparing Reports -- compose and update personnel reports;
- Mailing -- receive personnel reports;
- Filing -- retrieve and store personnel reports; and
- Graphics Teleconferencing -- not applicable.

E.5.2 LOGISTICS

E.5.2.1 Obtain Resupply Capability Information

- Interfacing -- receive data from the Combat Service Support System;
- Monitoring -- initiate database update;
- Computing and Manipulating Data -- retrieve resupply capability information from the database and update the database;
- Preparing Reports -- prepare requests for resupply information;
- Mailing -- request and receive resupply capability reports;
- Filing -- retrieve resupply capability reports; and
- Graphics Teleconferencing -- discuss tabular and graphics resupply capabilities and needs.

E.5.2.2 Develop Resupply Plans

- Interfacing -- exchange data with the Combat Service Support and Maneuver;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- compute inputs for resupply planning, such as delivery times and execute supply algorithms;
- Preparing Reports -- generate displays of supply status and resupply capability information and transcribe resupply plans;
- Mailing -- distribute information displays and resupply plans;
- Filing -- retrieve movement plans; file information displays and resupply plans; and
- Graphics Teleconferencing -- display and discuss information and develop plans.

E.5.2.3 Implement Resupply Plans

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare resupply orders and briefing slides and charts;
- Mailing -- distribute orders;
- Filing -- retrieve resupply plans and file orders; and
- Graphics Teleconferencing -- brief units on plans and orders.

E.5.2.4 Plan Maintenance/Repair Activities

- Interfacing -- exchange data with the Combat Service Support and Maneuver;

- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve information on available maintenance/repair support units from the database;
- Preparing Reports -- transcribe support plans;
- Mailing -- distribute support plans;
- Filing -- retrieve movement plans, retrieve reports on support units, and file support plans; and
- Graphics Teleconferencing -- display and discuss plans.

E.5.2.5 Implement Maintenance/Repair Plans

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare orders for maintenance/repair;
- Mailing -- distribute orders;
- Filing -- retrieve support plans and file orders; and
- Graphics Teleconferencing -- briefings.

E.5.2.6 Plan Equipment Recovery

- Interfacing -- exchange data with the Combat Service Support;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve information on available support units and battlefield geometry;
- Preparing Reports -- transcribe recovery plans;
- Mailing -- distribute recovery plans;
- Filing -- retrieve movement plans, retrieve reports on support units, and file recovery plans; and
- Graphics Teleconferencing -- display and discuss plans.

E.5.2.7 Implement Plans for Equipment Recovery

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare orders for equipment recovery;
- Mailing -- distribute orders;
- Filing -- retrieve recovery plans and file orders; and
- Graphics Teleconferencing -- explain plans and orders.

E.5.2.8 Synchronize Field Artillery Support and Sustainment Activities with Combat Service Support Operations

- Interfacing -- exchange data;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose messages and create briefing slides and charts;
- Mailing -- exchange messages, reports, and plans with combat service support;
- Filing -- retrieve reports and plans from files;
- Graphics Teleconferencing -- present and discuss operations.

E.5.3 STATUS REPORTS

E.5.3.1 Inventory Unit Supplies (Except Class V, Ammunition)

- Interfacing -- exchange data with combat service support;
- Monitoring -- route status reports based on report type;
- Computing and Manipulating Data -- not applicable;

- Preparing Reports -- prepare status reports;
- Mailing -- request supply inventory and send status reports;
- Filing -- not applicable; and
- Graphics Teleconferencing -- not applicable.

E.5.3.2 Compile Inventory Information

- Interfacing -- transmit data to the Combat Service Support System;
- Monitoring -- initiate automatic compilation;
- Computing and Manipulating Data -- combine supply data from subordinate units, compute summary measures, and retrieve supply status data from the database;
- Preparing Reports -- create required supply reports;
- Mailing -- receive and send supply reports;
- Filing -- retrieve and store supply reports; and
- Graphics Teleconferencing -- obtain, present, and discuss supply information.

E.5.3.3 Maintain Inventory Information

- Interfacing -- not applicable;
- Monitoring -- initiate automatic database updates;
- Computing and Manipulating Data -- update the database;
- Preparing Reports -- prepare and update supply reports;
- Mailing -- receive supply reports;
- Filing -- retrieve and store supply reports; and
- Graphics Teleconferencing -- not applicable.

E.5.3.4 Distribute Inventory Information

- Interfacing -- transmit data to the Combat Service Support System;
- Monitoring -- initiate data and information distribution;
- Computing and Manipulating Data -- retrieve inventory information needed for messages and reports from the database;
- Preparing Reports -- prepare messages and supply reports;
- Mailing -- send messages and supply reports;
- Filing -- retrieve supply reports; and
- Graphics Teleconferencing -- present and discuss supply information.

E.5.3.5 Establish Warning Condition Indicators

- Interfacing -- not applicable;
- Monitoring -- specify indicators for automatic monitoring;
- Computing and Manipulating Data -- specify automated computations, such as projected supply expenditure;
- Preparing Reports -- document procedures for manually monitored indicators;
- Mailing -- distribute procedures for manually monitored indicators;
- Filing -- store procedures for manually monitored indicators; and
- Graphics Teleconferencing -- not applicable.

E.5.3.6 Monitor Warning Condition Indicators

- Interfacing -- not applicable;
- Monitoring -- detect warning conditions and alert personnel;

- Computing and Manipulating Data -- perform computations and retrieve from the database status data used in warning condition indicators;
- Preparing Reports -- perform calculations; display data;
- Mailing -- receive status reports and alert personnel when warning conditions are indicated;
- Filing -- retrieve status reports and retrieve procedures for manually monitored indicators; and
- Graphics Teleconferencing -- obtain status information and alert personnel when warning conditions are indicated.

E.5.3.7 Determine Supply Requirements

- Interfacing -- not applicable;
- Monitoring -- monitor supply levels and alert personnel when prespecified minimum levels are detected;
- Computing and Manipulating Data -- retrieve supply status and consumption information from the database;
- Preparing Reports -- perform calculations;
- Mailing -- request input from subordinate units;
- Filing -- retrieve supply reports; and
- Graphics Teleconferencing -- not applicable.

E.5.3.8 Request Resupply

- Interfacing -- transmit data to the Combat Service Support System;
- Monitoring -- not applicable;

- Computing and Manipulating Data -- retrieve supply information needed for requests form the database;
- Preparing Reports -- prepare supply requests;
- Mailing -- send supply requests;
- Filing -- store supply requests; and
- Graphics Teleconferencing -- discuss implementation and priorities;

E.5.3.9 Determine Maintenance/Repair Requirements

- Interfacing -- receive data from equipment monitors;
- Monitoring -- alert personnel to maintenance/repair requirements detected by equipment monitors;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- not applicable;
- Mailing -- receive reports of equipment functioning;
- Filing -- retrieve equipment reports; and
- Graphics Teleconferencing -- not applicable.

E.5.3.10 Request Maintenance/Repair Support

- Interfacing -- transmit data to the Combat Service Support System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare requests for support;
- Mailing -- send requests for support;
- Filing -- store requests for support; and
- Graphics Teleconferencing -- not applicable.

E.5.4 AMMUNITION RESUPPLY

E.5.4.1 Obtain Ammunition Status Information

- Interfacing -- not applicable;
- Monitoring -- initiate database update;
- Computing and Manipulating Data -- update database and retrieve ammunition status information;
- Preparing Reports -- prepare requests for ammunition status information;
- Mailing -- request and receive ammunition status reports;
- Filing -- retrieve ammunition status reports; and
- Graphics Teleconferencing -- direct information collection.

E.5.4.2 Obtain Ammunition Resupply Capability Information

- Interfacing -- receive data from the Combat Service Support System;
- Monitoring -- initiate database updates and alert personnel to prespecified conditions;
- Computing and Manipulating Data -- retrieve resupply capability information, such as the number and location of ammunition supply trucks, from the database;
- Preparing Reports -- prepare requests for resupply information;
- Mailing -- request and receive resupply capability reports;
- Filing -- retrieve resupply capability reports; and
- Graphics Teleconferencing -- request and discuss resupply capabilities.

E.5.4.3 Develop Ammunition Resupply Plans

- Interfacing -- exchange data with the Combat Service Support System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- compute inputs for resupply planning, such as delivery times, and execute ammunition allocation algorithms;
- Preparing Reports -- generate displays of ammunition status and resupply capability information and transcribe resupply plans;
- Mailing -- distribute information displays and resupply plans;
- Filing -- file information displays and resupply plans; and
- Graphics Teleconferencing -- display and discuss information and develop plans.

E.5.4.4 Implement Ammunition Resupply Plans

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare resupply orders and briefing slides and charts;
- Mailing -- distribute orders;
- Filing -- retrieve resupply plans and file orders; and
- Graphics Teleconferencing -- brief units on plans and orders.

E.5.5 RECONSTITUTION

E.5.5.1 Determine Perscnnel and Materiel Requirements for Upgrading Unit

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve personnel and supply information from the database and TOE levels;
- Preparing Reports -- not applicable;
- Mailing -- receive reports concerning personnel, supplies, and equipment functioning;
- Filing -- retrieve personnel, supply, and equipment reports; and
- Graphics Teleconferencing -- not applicable.

E.5.5.2 Request Required Personnel and Materiel

- Interfacing -- transmit data to the Combat Service Support System;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve personnel and supply information needed for requests;
- Preparing Reports -- prepare requests;
- Mailing -- send requests;
- Filing -- store requests; and
- Graphics Teleconferencing -- not applicable.

E.5.5.3 Infuse New Personnel Into Unit

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- enter personnel assignments into the system for access by fire units;
- Preparing Reports -- prepare orders;
- Mailing -- send orders;
- Filing -- file orders; and
- Graphics Teleconferencing -- not applicable.

E.5.5.4 Supervise Unit Functioning

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve unit status information from the database;
- Preparing Reports -- compose messages;
- Mailing -- send and receive messages;
- Filing -- store records; and
- Graphics Teleconferencing -- not applicable.

E.5.6 SECURITY

E.5.6.1 Allocate Resources for Security Activities

- Interfacing -- not applicable;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- retrieve and update information on security forces;

- Preparing Reports -- compose orders;
- Mailing -- send orders;
- Filing -- file orders; and
- Graphics Teleconferencing -- not applicable.

E.5.6.2 Obtain Information from Security Forces

- Interfacing -- receive data from sensors and other systems;
- Monitoring -- detect priority information and alert personnel;
- Computing and Manipulating Data -- retrieve security information from the database;
- Preparing Reports -- compose messages;
- Mailing -- request and receive messages;
- Filing -- store messages; and
- Graphics Teleconferencing -- briefings.

E.5.6.3 Compile and Integrate Information from Security Forces

- Interfacing -- exchange data with other systems;
- Monitoring -- initiate automatic compilation;
- Computing and Manipulating Data -- perform compilation tasks such as associating related pieces of information and retrieve security information from the database;
- Preparing Reports -- generate security reports;
- Mailing -- send and receive security reports;
- Filing -- store and retrieve security reports; and
- Graphics Teleconferencing -- not applicable.

E.5.6.4 Determine if Breach of Security Occurs

- Interfacing -- exchange data with other systems;
- Monitoring -- check for situations such as an expected message not received from security personnel;
- Computing and Manipulating Data -- retrieve security information from the database;
- Preparing Reports -- display security information and compose messages;
- Mailing -- send and receive messages and data displays;
- Filing -- store and retrieve messages and data displays; and
- Graphics Teleconferencing -- display and discuss security information.

E.5.6.5 Alert Appropriate Agencies of Breach of Security

- Interfacing -- send alerts to other systems;
- Monitoring -- initiate alerts based on prespecified data;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- compose messages;
- Mailing -- send messages;
- Filing -- not applicable; and
- Graphics Teleconferencing -- alert personnel.

E.5.6.6 Exchange Information with Other Security Forces

- Interfacing -- exchange data with other systems;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- access security information in the database;

- Preparing Reports -- compose messages;
- Mailing -- send and receive messages;
- Filing -- retreive and store messages and reports; and
- Graphics Teleconferencing -- discuss security issues.

E.5.7 DATA EXCHANGE WITH COMBAT SERVICE SUPPORT SYSTEM

E.5.7.1 Transmit Status Data

- Interfacing -- send status data;
- Monitoring -- initiate data transmission based on prespecified situations, such as completion of a mission or planned troop movement;
- Computing and Manipulating Data -- retrieve status data to transmit;
- Preparing Reports -- not applicable;
- Mailing -- send status reports;
- Filing -- retrieve status reports; and
- Graphics Teleconferencing -- not applicable.

E.5.7.2 Transmit Requests for Resupply

- Interfacing -- send data to CSS;
- Monitoring -- initiate data transmission based on detected need for resupply;
- Computing and Manipulating Data -- not applicable;
- Preparing Reports -- prepare requests;
- Mailing -- send requests;
- Filing -- file requests; and
- Graphics Teleconferencing -- present and discuss requests.

E.5.7.3 Receive Plans for Combat Service Support Activities

- Interfacing -- receive data;
- Monitoring -- not applicable;
- Computing and Manipulating Data -- update the database;
- Preparing Reports -- not applicable;
- Mailing -- receive plans;
- Filing -- file plans; and
- Graphics Teleconferencing -- not applicable.